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BIG KARL MAGNET SPECTROMETER
Operating System
User's manual

by

J. Meißburger

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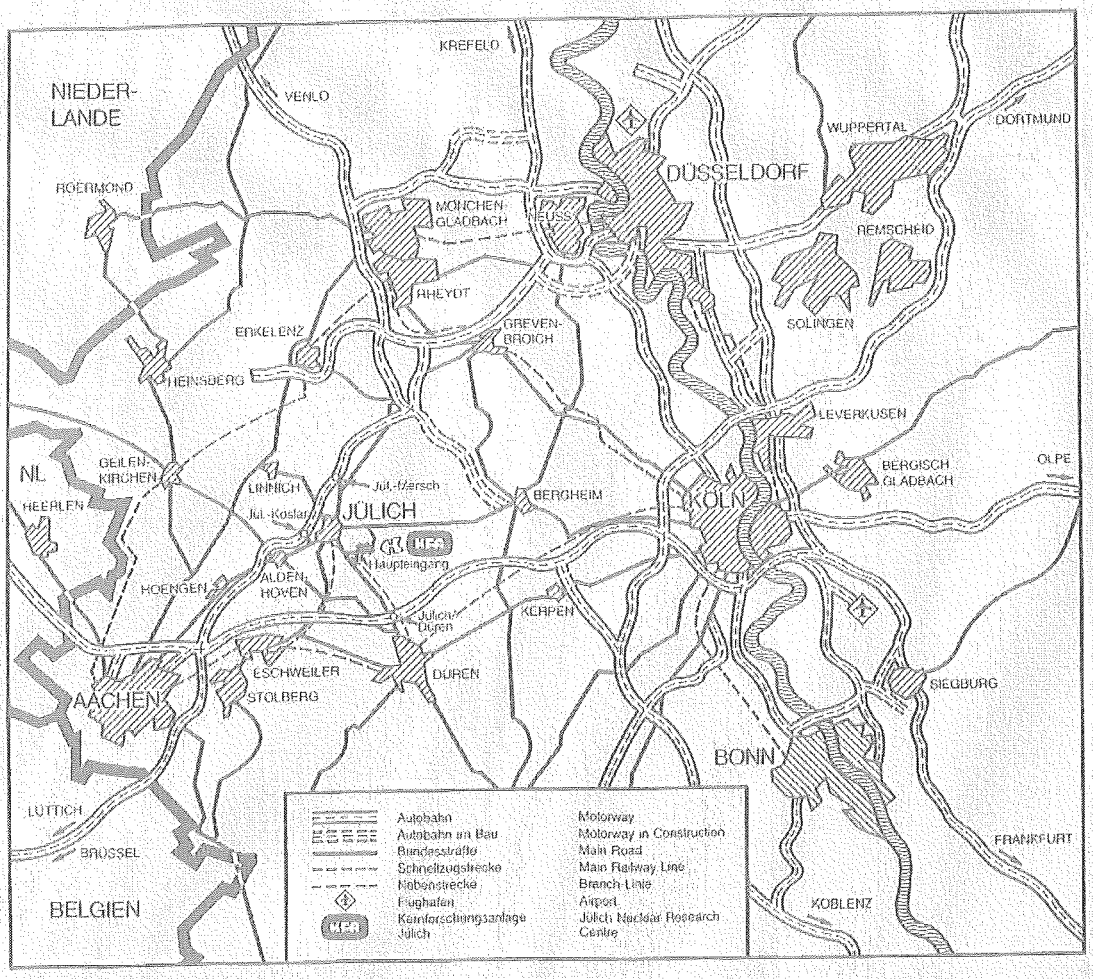

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BIG KARL MAGNET SPECTROMETER
Operating System
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J. Meißburger

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

I n t r o d u c t i o n

The high resolution magnet spectrometer **BIG KARL** is in operation since early 1979 at the nuclear research institute IKP of the KFA Jülich. A large number of experiments of different type and varying complexity has been carried out since then mostly in close collaboration between physicists of the IKP magnet spectrometer staff and external visiting groups.

The large number of instrumentation parameters and the sophisticated ionoptical optimization procedures clearly demand for computer control and operating support especially if one considers the large distances between spectrometer area, cyclotron- and experimental control rooms.

On the other hand the rather complex detector and data acquisition systems require a computer whith sufficient computing power and high speed peripheral I/O to provide on-line control of the experiment, real-time data handling capabilities and a significant amount of general support for preparing and performing an experiment. Finally the rough experimental data have to be processed to deliver the concentrated physical results ready for publication.

The Big Karl operating system comprises two computers, one small DEC PDP-11/40 system for control and a VAX-11/780 (the only 32-bit "supermini" available at that time) for data acquisition and analysis.

1) Spectrometer Control

Computer control is handled by a PDP-11/40 computer running RSX-11M which controls all spectometer components such as movable slits, field measurement probes, magnet currents or general purpose multiplexed DVM's. In addition this computer does automatic background logging of all control activities in order to generate status reports or to display and analyze measured magnetic field data for ionoptical optimization. The main tasks to do these jobs are:

CYCLE Spectrometer control main task

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STATUS	Spectrometer status report generation
CYSTOP	Unsolicited operating system reset (emergency)
RESET	Control system soft reset
ZEROPS	Control system database initialization
FUMMEL	Magnetic field measurement task
FUPLOT	Interactive field measurement plotting and anlyzing utility
SAVBATCH	Procedure to save log files
SAVDATA	Procedure to save data files

CAMAC interface testing is done automatically at system startup. In addition there is a set of tasks available for testing single or complex components of the control system. (Examples are TTCYC wich tests the CYCLE global section and backup file consistency, TTSPRE which tests the iterative direct field setting of the main quadrupoles, or TTHT which tests the control of the 24 Ht power supplies)

More detailed information on the system is available on-line using the commands:

MCR> HELP	System help	and
MCR> HELP	Applications help	

2) Data Acquisition and Analysis

A special hardware system MEMPHIS with fast hardware preprocessing and windowing capabilities has been developed by the KFA's central laboratory of electronics ZEL. It interfaces up to 16 high resolution ADC's, TDS's or pattern units via CAMAC to a VAX unibus. The software utilities

MEMPHIS	MEMPHIS hardware configuration
MPSTATUS	and hardware status logging

are available for user-friendly and self-documenting definition and downloading of hardware configurations to the microprocessor-controlled MEMPHIS system.

The main data acquisition tasks (ACQUIRE) are:

ACON	ACQUIRE main data taking task
ACPARAM	Pseudo-parameter definition
ACSTATUS	Data taking soft/hardware status

which run on a special dedicated user account BK_ONLINE. While the MEMPHIS system provides **physical and pseudo-ADC's** (by the internal hardware processing units) the ACON system allows free **user-defined pseudo-parameter definitions** (Definition language is Fortran) to handle more complex detector setups such as the Morris-type drift chambers. The interactive utility

MOCAL	Morris chamber calibration

is available for on-line generation of the Morris-chamber calibration tables used in ACON/ACPARAM pseudo-parameter definition.

List mode data taken by ACON may be reanalyzed be the off-line sorting utilities

PLSORT	General purpose off-line sorting
ACOFF	Off-line version of ACQUIRE

where PLSORT offers various features such as batch mode sorting, one-dimensional and scatter plot displays, complex gate definitions and **ACPARAM-compatible pseudo-parameters**. In order to document or further process the sorted spectra the utilities

ACPLOT	Line plotting of spectra
ACSPECT	Spectrum fitting and analysis
BKMERGE	Spectrum manipulation and display

are available to accept true physical or Monte-Carlo-generated spectra and produce any kind of combined or user-manipulated pseudo-spectra, enhanced screen or hardcopy displays and extracted physical summary data (fits) which are input to the physical data analyzing system

BKDAP	Big Karl data analysis programs, Cross sections, angular distributions and DWUCK

3) Spectrometer operating support

In parallel to the on-line control and data acquisition tasks a set of utilities for experimental setup and ionoptical spectrometer tuning is available:

BKARLO	Particle Energy loss trough layered layered detector setups
BRHO	General purpose kinematics with muptiple targets and backing
BKSEARCH	Calibration reactions crossover search
MAGSET	Semi-empirical magnetic field setting
MATRIX	Experimental raytracing and spectrometer optimization utility
KIN1	Spectrometer K-value tuning

4) General User Support

In addition to these more specific tasks a set of commonly used programs for spectrometer performance tuning and general purpose data analysis are installed:

TRANSPORT	CERN/SLAC TRANSPORT ionoptical code

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Author: J.Meissburger

TURTLE	CERN TURTLE-decay
MAD	CERN MAD ionoptical design program
STRAGGLE	Energy straggling (Vavilov distribution)
MINUIT and MINFIT	CERN general purpose fitting utility with enhanced user support (MINFIT
FOWL	CERN FOWL phase space calculation
IGM	Big Karl Interactive Graphics Monitor
CTR	COSYTRIEVE database manager (Publication index or CAMAC module database)

For Fortran programmers a collection of object libraries is found on a dedicated directory BKLIB: which comprises

CERN	The CERN library (VMS version)
GMAGII (AGII)	Tektronix Advanced Graphing II with enhanced
GMA10 (PLOT10)	PLOT10 terminal control system (TCS)
CALCOMP and CALTRON	CALCOMP line plotter library and Calcomp emulator for Printronix graphics printer,
BKUTY	Big Karl utility subroutines

which offer a set of **BK TT....** routines for general system support particularely for user-transparent terminal configuration in graphic applications and the **RD...** routines for free-style terminal I/O with instrinsic logging, batch, journal/recovery and error-tolerant modes. The RD-routines are thouroghly used by the Big Karl utilities for standard command parsing.

The by far most important support on the system is provided by the extensive **Big Karl HELP library** which allows keyword-oriented access by either the

```
$ BKHelp      Help command at DCL level
```

or by a HELP-command at program command level and which documents the entire

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

Big Karl operating system down to command parameter and library subroutine source header level. Details on the BKHelp command and how to produce hardcopies are found with

$ BKHelp BKHELP...

The basic operating principles of the spectrometer Big Karl and its focal plane detectors are summarized in the following three publications which are mandatory for anyone wishing to do a Big Karl experiment:

1) Der Magnetspektrograph BIG KARL
und die Untersuchung des Übergangskernes ^{103}Ru
mit (d,p)- und (p,d)-Reaktionen
W.Hürlimann,
Thesis, KFA internal report, Jül-Spez-104, April 1981

2) The QQDDQ Magnet Spectrometer "BIG KARL"
Nucl. Instr. and Meth. 214 (1983) 281-303

3) The new focal plane detector
for the magnet spectrometer Big Karl
Nucl. Instr. and Meth. A242 (1985) 95-102

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP HELP (14 July 1986):

HELP

```
**************************************************
*  BIG KARL magnet spectrometer operating system  *
**************************************************
```

H E L P L I B R A R Y

This library provides Big Karl users with the necessary information to operate the magnet spectrometer control and data acquisition system. For more details on the BKHELP command use "$ BKHelp BKHELP" !

Author: J.Meissburger, KFA-IKP,

Last library update: 14 July 1986

Additional information available:

ACPLOT	ACQUIRE	BKARLO	BKFIT	BKHelp	BKLIB	BRHO
CERN	COSYTRIEVE	CTR	CYCLE	FUMMEL	FUPLOT	Graphics
HELP	IGM	MATRIX	MEMPHIS	MINIMI	MINUIT	MOCAL
NEWS	PATCHY	PLSORT	PRINTERS	RDSHOW	RSX11M	RUNOFF
System_layout		Telephone	Terminals	Utilities		

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP BKHELP (14 July 1986):

BKHELP

BIG KARL magnet spectrometer operating system

****

H E L P L I B R A R Y

This library provides Big Karl users with the information needed to operate the magnet spectrometer computer control and data taking systems. It includes:

	General system information	(NEWS)
>>>	**Description of operating utilities**	**(UTILITIES) <<< read this**
	Library documentation incl. source listings	(BKLIB)
	Program level command description	(utility name)

****

To keep track of recent developments it is strongly recommended to use: **$ NEWS** or **$ BKHelp NEWS** at least once before starting a new experiment !

****

To access the help information type:

```
$ BKHelp      key1, key2, ......
```

where key1, key2 are the search keys listed under "further information available:"

or

```
$ BKHelp/output=BKHELP.LIS     key1, key2, ......      and
$ Print/delete BKHELP.LIS
```

to get a hardcopy of the BKHELP information.

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

Remember: **Despite all documentation a basic understanding of magnet spectrometers and computers is highly desirable for performing a Big Karl experiment !**

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP ACPLOT (14 July 1986):

ACPLOT

****

*** ACPLOT ***

****

Author: B.Brinkmoeller

The Program ACPLOT may be used to make a histogram plot of spectra stored in *.SIN - files.
The output device is either the CALCOMP PLOTTER or the PRINTRONIX LINE PRINTER/PLOTTER.

valid commands are :

READ	:	to read data from a *.SIN - file
SET	:	to set new paramters for the plot
STATUS	:	to see the present parameters and the data stored
HELP	:	to get informations about the program
PLOT	:	to plot arrays of the stored *.SIN - files
EXIT	:	to exit to DCL level
PAGE	:	to start following plot on new page

ACPLOT

READ

the READ command is used for data transfer to the program

You have to give the name of the data file to read.

It will prompt you for the array numbers you wish to transfer.
If you do not give any array number the first sixteen arrays of
the file will be transfered to the program.

The maximum number of arrays that can be stored at one time is sixteen.

ACPLOT

SET

with the SET command you can change the following parameters :

XMIN	the minimum channel number for the plot
XMAX	the maximum channel number for the plot
PEN	the number of the pen used for plotting
LENGTH	the length of the plot
HEIGTH	the heigth of the plot
YMIN	the minimum y - value displayed
YMAX	the maximum y - value displayed
COM	compress factor

The program will prompt you for new values of each parameter
If you press <RETURN> the parameter value is not changed

To supress the prompting you may specify the parameters you want
to change in the form: "SET LEN 30 XMA 1000"
Only the parameter LENGTH and XMAX are changed and the program returns
to command level

ACPLOT

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

SET

XMIN

If you enter the parameter "XMI"
you may change the minimum channel number for the plot

You are not allowed to give a minimum x - value larger than
the maximum x - value unless XMAX is not equal to zero

If XMIN is equal to zero the program sets the minimum x - value
equal to one

ACPLOT

SET

XMAX

If you enter the parameter "XMA"
you may change the maximum channel number of the plot

You are not allowed to set XMAX lower than XMIN

If XMAX is equal to zero the program sets the maximum x -value
equal to the size of the array to be plotted

ACPLOT

SET

PEN

If you enter the parameter "PEN"
you may change the number of the pen used for plotting the output

Pen numbers in the range from 1 to 4 are allowed
the pen number does not have any influence if the output device is the line printer

ACPLOT

SET

LENGTH

If you enter the parameter "len"
you may change the length of the plot

There is no restriction on the maximum length

ACPLOT

SET

HEIGTH

If you enter the parameter "HEI"
you may change the heigth of the plot

the heigth of the plot is limited by the paper - width on
the output device that you choose

ACPLOT

SET

YMIN

If you enter the parameter "YMI"
you may change the minimum y-value for the output

You are not allowed to give a minimum y - value larger or equal to
the maximum y - value unless XMAX is equal to zero

If YMIN is equal to zero the program will set the minimum y - value
to zero or the minimum negativ value in the array to be plotted

ACPLOT

SET

YMAX

If you enter the parameter "YMA"
you may change the maximum y - value for the output

You are not allowed to give a maximum y - value lower than or equal to the minimum y - value unless you set it to zero

If YMAX is equal to zero the program sets the maximum y - value to zero or the maximum positiv value in the array to be plotted

ACPLOT

SET

COMPRESS

If you enter the parameter "COM"
you may change the compress factor of the spectra

The maximum compress factor is 99

ACPLOT

SET

DEFAULT

If you enter "DEF"
the parameters of the plot are reset to defaults that were found suitable for the output device you choose

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ACPLOT

SET

RETURN

If you enter "RET"
you return to the command level

Everything you enter after the "RET" is interpreted as an ACPLOT command

"RET" is usefull to supress prompting for parameters you do
not want to change

It has to be used if you want to enter ACPLOT commands after the "SET"
command on the same textline.

ACPLOT

EXIT

Exit to DCL - level

If the output - device is the PRINTRONIX LINE PRINTER PLOTTER this command
submits the output to the printer queue

ACPLOT

STATUS

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Author: J.Meissburger

With the STATUS command you can display the parameters specifying the output and information about the data stored

ACPLOT

PLOT

With the PLOT command you can produce histogram plots of the spectra on the output device you choose

The program prompts you for the numbers of the arrays you want to plot. If you do not give any array number the program will plot all arrays stored

To change the parameters of the plot like LENGTH and HEIGTH and minimum and maximum x - and y - values, use the SET - command before using the plot command.

ACPLOT

PAGE

The PAGE command enforces output of the following plot on the next page.

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Author: J.Meissburger

BKHELP ACQUIRE (14 July 1986):

ACQUIRE

****

* A C Q U I R E *

****

BIG KARL data acquisition utility

Authors: D.Kouzes, R.Weber, H.Stoff, J.Meissburger

The utility is invoked by two DCL-level commands:

$ ACON	for on-line data taking with MEMPHIS
$ ACOFF	for off-line default sort and display

It is supported by additional procedures AC... to facilitate tape handling and file management. These procedures are strongly recommended to be used in order to guarantee unique file and tape formats!

The ONLINE utility ACON can o n l y be run by the turnkey-user

BK_ONLINE (UIC = [100,100])

and produces its data files on directory USERON. These files have to be saved by the user to either magtape or any of the private directories.

ACQUIRE

EXAMPLE

LOGIN

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Author: J.Meissburger

*****

To start data acquisition with Big Karl's VAX/MEMPHIS log in as:

username: BK_ONLINE
password: ..... (ask BK-Manager)

This puts you onto the on-line directory USERON and in addition displays some information on required data files:

MPSxxx = MEMPHIS configuration batch file
MOCxxx = Latest MOCAL calibration file

and a Fortran source file to define BK_USER_INI for ACQUIRE parameter setup initialization. Keep a hardcopy of these filenames !

Now perform a few checks before starting:

$ SHOW QUOTA check for free disk space, >10000 blocks !
$ SHOW DEVICE check for online condition and error counts on:
DRA1: Userdisk
DUA1: Data disk
CAxx: Camac
GMA0: GMA display

+----------

SETUP MEMPHIS

****

Logon as BK_ONLINE on the BK-VAX and type:

```
$ MEMPHIS
MEM> SET COIncidence 1 SET COIncidence 2 [SET NOCoincidence xx]
MEM> EXIT
```

```
.........
MPSLINK> EXIT

$ MPSTatus      Check physical ADC range switches,
                MEMPHIS ADC configuration and coincidence !
```

If necessary perform a hard reset by pressing the RESET-button on the MEMPHIS microprocessor unit (rightmost module, use pencil !) and reload configuration with MPS.

+----------

MOUNT A NEW MAGTAPE

Magtapes to be used by ACQUIRe must be mounted b e f o r e invoking ACON ! Type:

```
$ ACINI
....            Default label is the volume-id
                BKxxxx (xxxx = green sticker on tape)
                Default density (<RET>) = 1600 bpi
```

This initializes (empties and lables) the tape and mounts it for use by ACQUIRE.

+----------

START ACQUIRE

Now you are ready for taking data:

```
$ ACONline
.... <RET>      No new realtime process (user parameters)
```

```
      <RET>       Magtape already mounted
      GMAO:       plot terminal (<RET> = your terminal)
      <RET>       511 events per buffer (obligatory with tape !)

ACON> RE,D
....  <RET>       read last MAIL file to restore spectra setup
ACON> TAPE        switch on list mode data taking on magtape
```

+----------

PRODUCTION LOOP
****

********** Data taking loop for production starts here **********

```
ACON> ZA,A        Clear old spectra
ACON> AC          Start datataking

....              Please write a short comment to your list mode
                  file containing typically at least:
                         Target type
                         Reaction type
                         Lab angle
                         Special comments
<RET>
ACON>             <<<<<<<<<< data taking is now active ! >>>>>>>
```

If you need to stop data taking for any reason (to check electronics, system overload by high intensity etc.) you should use the BIG SWITCH on the NIM crate. This virtually holds real time without changing any hard- or software condition.

For longer STOPS you better stop data taking and close the data file:

```
ACON> ST        stop data taking
ACON> EF        Close your list mode file (End File)
ACON> DS        Display scalers >>>>>  L 0 G B 0 0 K !
                >>>> Make a hardcopy of the borer scalers
                and make notes in the  L 0 G B 0 0 K !

ACON> DU,D      write your sorted spectra to disk
....            comment see above
```

********** Data taking loop for production ends here **********

+----------

PRODUCTION END
****

Close and dismount the magtape

If you are near the end of your tape or if you want to continue on a new tape:

```
ACON> NT        Disable list mode tape
ACON> DU        Dump mail file
....            Comment: FOR PARAMETER SETTING
ACON> EXIT

Do you want to keep the on-line process running (Y/N): NO

$ ACDISmount    Dismount/nounload your tape
```

Take the write-ring off and put the tape back in the cupboard !
Get the next free tape (see above)

In order to save a l l data files important to your experiment on a backup tape it is strongly recommended to use:

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$ ACSAVE

after finishing your run. ACSAVE not only saves the on-line spectra but also the software and hardware configuration files as well as any parameter definitions or calibration tables.

+----------

TAPE REQUESTS
****

In case you run into troubles with a magtape service (e.g. unexpected End Of Tape) you may login as:

username: OPERATOR
(no password)

The system displays a list of outstanding tape service operator requests. Cancel your request by typing in the corresponding REQUEST-ID number
b e f o r e you exit ACQUIRE !!!!!!!!!!!!

ACQUIRE

COMMANDS

ACQUIRE

COMMANDS

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Author: J.Meissburger

SUMMARY

Alphabetical Summary of ACQUIRE Commands 03-OCT-81

Assignments: DUMP$DEVICE = default disk
EVENT$DEVICE= default disk
or EVENT$DEVICE= MAGTAPE if tape is mounted

type: ..ACQ>HELP ERRORS for error messages

type: ..ACQ>HELP xxxx where xxxx is any legal command

@filename	Start command file 'FILENAME.BAT'
2D	Create a two dimensional array
ACQ	Start data taking from MEMPHIS
ADC	Set ADC associated with array
ARRAY	Define one dimensional arrays
BELL	Ring bell
CLEAR	Clear Graphic Scope screen (after SCOPE)
CONDITION	Set side conditions on storing data
DARRAY,n	Delete array N
DSCALERS	Read and display current scaler values
DUMP	Dump parameters and arrays to DUMP$DEVICE
DUMP,D	Dump parameters and arrays to DUMP$DEVICE
DUMP,E	Dump parameters and arrays to EVENT$DEVICE
EFILE	Write an END OF FILE on magnetic tape
EXIT	Exit the programm
GAINS	Set ADC conversion gain (only for 2D arrays)
LIVE	Show the live data coming into an array
MSCALER	Manipulate Preset Scaler
NOTAPE	disable list mode on magtape
OFFSET	Set array zero offsets
PARAMETERS	List the actual data taking parameters

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PARAMETERS,P	Print the actual data taking parameters on line printer
PPLOT,n	Printer plot of 1-D array N
PRINT,n	Print array N on lineprinter
READ	Read data arrays or list mode data from DUMP$DEVICE
READ,D	Read data arrays or list mode data from DUMP$DEVICE
READ,E	Read data arrays or list mode data from EVENT$DEVICE
READ,O	Read data arrays or list mode data from other directory
SCOPE	Display array on Graphic terminal
SCOPE,n	Display array N on Graphic terminal (prev. scale)
SINGLES,n	Set Singles mode of data taking (default)
STOP	Stop data taking from MEMPHIS
SUM	Sum data array shown on scope within limits (Cursor)
SUM,A	same, but enter channel numbers from keyboard
TAPE	Enable list mode data taking on magtape
ZAP,n	Set array N to zero
ZAP,ALL	Set all arrays to zero

ACQUIRE

COMMANDS

ERRORS

If the user enters an invalid command, the program outputs a message

ERR?xx, where xx is:

BT	Bad Tape
SP	Write Protected
PE	Parity Error
CC	Invalid control command

NC	No more core available
AB	User request aborted
ET	End of magnetic tape
NP	No parameters have been entered
MT	Magnetic tape error
NS	No SAVE command given
TP	Too many parameters
LP	Printer error or tape at load point
DK	Disk error
EV	Event mode task error
FL	Digital input flag error
OP	Error on OPEN attempt

ACQUIRE

COMMANDS

@

@filename Start command file 'FILENAME.BAT'

---

command file must be created with: $ EDI filename.BAT
example of a command file:

```
SINGELS,1
ARRAY
1
1
2048
_
_
2D
```

```
2h
1,128,0,32
2,128,0,32
_
_
PARAMETERS
ZAP,ALL
```

ACQUIRE

COMMANDS

2D

```
2D              Create a two dimensional array
-----------------------------------------------

ACQ>2D
ARRAY #? 5_\
X ADC, SIZE, OFFSET, GAIN:7,128,0,16
Y ADC, SIZE, OFFSET, GAIN:8,32,0,32
CONDITION ADC #? _\
ARRAY #? __\
ACQ>
```

ACQUIRE

COMMANDS

ACQ

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ACQ Start data taking from MEMPHIS

ACQUIRE

COMMANDS

ADC

ADC Set ADC associated with array

```
ACQ>ADC
ARRAY #? 2_\
ADC #? 8_\
ARRAY #? __\
ACQ>
```

ACQUIRE

COMMANDS

ARRAY

ARRAY Define one dimensional arrays

```
ACQ>ARRAY
ARRAY #? 3_\
```

```
ADC #? 3_\
SIZE? 512_\
CONDITION ADC #(0 TO CLEAR) _\
ARRAY #? 4_\
ADC #? 4_\
SIZE? 512_\
CONDITION ADC #(0 TO CLEAR) _\
ARRAY #? __\
ACQ>
```

ACQUIRE

COMMANDS

BELL

```
BELL            Ring bell
-------------------------
```

ACQUIRE

COMMANDS

CLEAR

```
CLEAR           Clear Graphic Scope screen
------------------------------------------
```

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ACQUIRE

COMMANDS

CONDITION

CONDITION Set side conditions on storing data

```
ACQ>CONDITION
ARRAY #? 1_\
CONDITION ADC #(0 TO CLEAR) 3_\
LOWER LIMIT(4K SCALE), OPTIONAL MULTIPLIER
200
UPPER LIMIT(4K SCALE), OPTIONAL MULTIPLIER
500
CONDITION ADC #(0 TO CLEAR) 4_\
LOWER LIMIT(4K SCALE), OPTIONAL MULTIPLIER
50
UPPER LIMIT(4K SCALE), OPTIONAL MULTIPLIER
100
CONDITION ADC #(0 TO CLEAR) _\
ARRAY #? __\
ACQ>
```

ACQUIRE

COMMANDS

DARRAY

DARRAY,N Delete array N

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Author: J.Meissburger

```
ACQ>DARRAY
ARRAY #? 2_\
ACQ>
```

ACQUIRE

COMMANDS

DSCALERS

DSCALERS	Read and display current scaler values

ACQUIRE

COMMANDS

DUMP

DUMP	Dump parameters and arrays

DUMP	Dump parameters and arrays to DUMP$DEVICE file is MAIL.SIN for default mailbox file
DUMP,D	Dump parameters and arrays to DUMP$DEVICE filenames are automatically updated to ACxxxx.SIN
DUMP,E	Dump parameters and arrays to EVENT$DEVICE filenames are automatically updated to ACxxxx.SIN

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Author: J.Meissburger

ACQUIRE

COMMANDS

EFILE

EFILE Write an END OF FILE on magnetic tape

---

close list mode file on magnetic tape

ACQUIRE

COMMANDS

EXIT

EXIT Exit the programm

NOTE: EXIT does n o t stop the subprocess created by ONLINE Acquire. To stop the subprocess, use $ ACSTOP !!!!

ACQUIRE

COMMANDS

GAINS

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

GAINS Set ADC conversion gain (default by MEMPHIS)

```
ACQ>GAINS
ARRAY #? 1_\
GAIN? 1__\
ARRAY #? __\
ACQ>
```

ACQUIRE

COMMANDS

LIVE

LIVE Show the live data coming into an array

ACQUIRE

COMMANDS

MSCALER

MSCALER Manipulate Preset Scaler

```
ACQ>MSCALER
VALUE? 1000__\
ACQ>
```

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

ACQUIRE

COMMANDS

NOTAPE

NOTAPE disable list mode on magtape

ACQUIRE

COMMANDS

OFFSET

OFFSET Set array zero offsets

ACQUIRE

COMMANDS

PARAMETERS

PARAMETERS Print the data taking parameters

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

PARAMETERS,P Print the data taking parameters on lineprinter

PARAMETERS Type the data taking parameters on terminal

ACQUIRE

COMMANDS

PPLOT

PPLOT,n Printer plot of 1-D array N

ACQUIRE

COMMANDS

PRINT

PRINT,n Print array N on lineprinter

ACQUIRE

COMMANDS

READ

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

READ Read data arrays or list mode data

READ Read data arrays or list mode data from DUMP$DEVICE
<RET> for filename reads the default mailbox file

READ,D Read data arrays or list mode data from DUMP$DEVICE
<RET> for filename reads the default mailbox file

READ,O Read data arrays or list mode data from DUMP$DEVICE,
but from OFFLINE directory when running ONACQ
and from ONLINE directory when running OFFACQ
<RET> for filename read the default mailbox file

READ,E Read data arrays or list mode data from EVENT$DEVICE

ACQUIRE

COMMANDS

SCOPE

SCOPE Display array on Graphic terminal

SCOPE Display array on Graphic terminal

SCOPE,n Display array N on Graphic terminal (prev. scale)

ACQUIRE

COMMANDS

SINGLES

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

SINGLES,n Set Singles mode of data taking (default)

ACQ>SINGLES,6

ACQ>

ACQUIRE

COMMANDS

STOP

STOP Stop data taking from MEMPHIS

ACQUIRE

COMMANDS

SUM

SUM Sum data array shown on scope

SUM Sum data array shown on scope within limits (Cursor)

SUM,A same, but enter channel numbers from keyboard

The following subcommands are accepted by SUM:

0 = EXIT back to main command level

1 = MARK channel position with cursor

2 = REPLOT
3 = SCALE up
4 = SCALE down
5 = SUM channels and print LSQ-statistics
6 = Ask for CHANNELS
7 = MARK and subtrakt background
8 = Perform Gauss FIT

K = KILL (delete) Matrix file ACMTX.TMP
R = SUM and add record to ACMTX.TMP
B = BLANK line added to ACMTX.TMP

ACQUIRE

COMMANDS

TAPE

TAPE Enable list mode data taking on magtape

ACQUIRE

COMMANDS

ZAP

ZAP Set array to zero

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

ZAP,n Set array N to zero
ZAP,ALL Set all arrays to zero

ACQUIRE

PROCEDURES

ACQUIRE COMMAND PROCEDURES: 21-JUL-83
==========

>>>>> These procedures are available o n l y if logged on
>>>>> as a Big Karl group user BK_....

ACQUIRE

PROCEDURES

ONSET

$ ONSet --> Set default to online directory USERON

ACQUIRE

PROCEDURES

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

ACONline

$ ACONline --> Start ONLINE Acquire program on directory USERON

ACQUIRE

PROCEDURES

ACSTOP

$ ACSTop --> Stop ONLINE Acquire subprocess
>>> Exiting the ACQUIRE program does N O T
>>> stop the related ONLINE subprocess !!!!!

ACQUIRE

PROCEDURES

ACOFFline

$ ACOFf --> Start OFFLINE Acquire program

ACQUIRE

PROCEDURES

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

ACPARAM

$ ACParam --> Define ONLINE user parameters (pseudoparameters)

ACQUIRE

PROCEDURES

ACSTATUS

$ ACStatus --> Show the actual ONLINE parameter and MEMPHIS status

ACQUIRE

PROCEDURES

ACSPECT

$ ACSPect --> Start OFFLINE fit program SPECT

ACQUIRE

PROCEDURES

ACPLOT

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

$ ACPlot --> Plot spectra (*.SIN) on CALCOMP-1012 plotter
or on Printronix dot matrix printer

>>> Before plotting on CALCOMP plotter
>>> check plotter status first (line switch) !!!
>>> Then press: RESET (rear panel, light flickering)
>>> INDEX (>2 seconds!)
>>> MODE (ligth stays stable)

ACQUIRE

PROCEDURES

ACDUMP

$ ACDump --> Dump data files in ACQUIRE format

ACQUIRE

PROCEDURES

ACINIT

$ ACInit --> Initialise and mount a new magtape

ACQUIRE

PROCEDURES

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

ACMOUNT

$ ACMount --> Mount an initialized and labeled tape

ACQUIRE

PROCEDURES

ACDISMOUNT

$ ACDIsmount --> Dismount a magtape

ACQUIRE

PROCEDURES

S15PLOT

$ S15plot --> Plot old PDP15 spectra sorted on PDP-11/40

ACQUIRE

PROCEDURES

ACSAVE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

$ ACSAve --> Save online data on save device
(give starting date of your experiment)

ACQUIRE

PROCEDURES

REWIND

$ REWind --> Rewind a mounted magtape

ACQUIRE

MEMPHIS

The utility MPS is used to configure the Big Karl data acquisition hardware MEMPHIS for a desired experimental setup. It is invoked by typing $ MPS at DCL command level when logged on as BK_ONLINE

To see the actual status of MEMPHIS (ADC configuration and coincidence) type: $ MPSTATUS

ACQUIRE automatically creates a default batch file MEMPHIS.BAT which always reflects the true hardware confi- guration of MEMPHIS (not taking into account any user- modification of parameters)

For more information see: $ BKHelp MEMPHIS...

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP BKARLO (14 July 1986):

BKARLO

****
* B K A R L O *
****

Authors: J.Meissburger, R.Korthues

Calculate particle energy loss through the BIGKARL magnet spektrometer and its different detector layers.

New BKARLO data file layout:

The primary input file has extension *.INP and resides on YOUR private directory.

The *.MOD module files and *.DAT data files remain on USERDISK:[USER.BKARLO] and are read from there !

BKARLO

Input_file

The *.INP file is the primary data input file to BKARLO. It contains a list of module names and the gas pressure in the module where appropriate (mbar).
A modulename is a character string (e.g.:'MOD1') which must be first on the line. Leading blanks are ignored.
If a module contains a gas volume (or vacuum) the gas pressure must be defined on the same line separated by at least one blank character. (Note: Gas pressures cannot

be exactly 0 !). Reading of numbers is format-free.

BKARL0

Input_file

EXAMPLE

```
modulename:        pressure        comment
-----------------------------------------------
'MORRIS'         1000.                Morris chamber
'AIRGAP30'             500.           air gap
```

BKARL0

Module_file

A module file (*.MOD) contains a list of different layers. The total number of layers n of a module is given by the paramter L in the form "L=n".
BKARL0 expects a list of n lines containing each a character string specifying the layer name, and the thickness of that layer in mm. The layer name must be first on the line besides any optional blanks. The layer thickness is separated by at least one blank on the same line. Reading is format-free.

BKARL0

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

Module_file

EXAMPLE

L=3 Number of layers

layer	thickness	comment
'MYLAR'	0.005	first layer
'MOGAS1'	2.9	
'AIR'	30	

BKARLO

Data_file

The data file (*.DAT) contains the physical description of the molecules present in a single layer.
A layer consists of i molecules. This must be defined in the form "I=i" for gas layers and "I=-i" for solids.
In the following block the molecules are described in the form:

```
p1 %   A=a1  N=n1   z1 ATOM
        .     .       .
        .     .       .                one molecule
        .     .       .
       A=am  N=nm   zm ATOM
p2 % ...
.
.                                 next molecule
```

.

pn % ...

With:

p = fraction in percent (volume for gases, weight for solids) of one molecule in the layer

a = atomic mass number of contributing atom

n = nuclear charge of contributing atom

z = number of atoms of type A,N present in this molecule

This block is limited by a line containing blanks.
If the program finds a numerical value in one of the following lines before EOF this value will be read format-free and interpreted as layer density.
If the layer represents a plastic scintillator a "1" in the following line tells BKARLO to calculate light output for this layer.

BKARLO

Data_file

EXAMPLE

FILE: NE110.DAT Delta-E plastic scintillator

I=-1 number of molecules in the layer, negative for solids

100 % , A= 1 , N=1 , 1104 ATOMS ; HYDROGEN
A=12 , N=6 , 1000 ATOMS ; CARBON

1.03D0 DENSITY

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

1 SCINTILLATOR LIGHT OUTPUT SWITCH

BKARLO

Theory

The program calculates for each layer the specific compound- or gas-mixture energy loss by a d d i n g the weighted contributions of the different atoms in the mixture. The mean density is calculated as for an ideal gas.

Mean ionization potentials are empiric for nuclear charges smaller than 33 and are theoretically calculated for heavier nuclei.

The energy loss of a particle is then integrated as it passes through the layers of the detector setup and looses energy.

For more details ask: J.Meissburger

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP BKFIT (14 July 1986):

BKFIT

****

* B K F I T *

****

Authors: J.Meissburger, M.Witteler

The B i g K a r l general purpose analyzing program to

read , write, merge , modify , analyze and display

data files written in Big Karl standard format (*.SIN)

BKFIT

COMMAND_FORMAT

Commands are executed several in one line from left to right and separated by at least one blank according to Big Karl's standard free style input:

Three characters minimum are required for command recognition except for the special commands:

"!" and ";"	which indicate a following comment, and
"?"	which gives a list of valid commands

Numeric input is format-free and is defaulted automatically to appropriate values or prompted for if required.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

Interactive command input format is identical to program level batch mode input and to the journal file output which may be used to reproduce a complete session. In addition all input and output goes to a logging file for later reanalysis.

BKFIT

PROGRAM_STRUCTURE

BKFIT is used to make modifications on single spectra or to create new, combined pseudo-spectra. The singles spectra as stored in BIG KARL standard *.SIN format (e.g. ACQUIRE or BKFIT) are read into the READ buffer by means of the READ command (SHO READ). Part or all of may subsequently SAVEd into a SAVE buffer. All actions of merging, modifying or displaying refer to the spectra in the save buffer (SHO SAVE). The save buffer may either be filled from different *.SIN files or by BKFIT as a result of the manipulations. The REAL*4 format of the save arrays reduces rounding errors and overflows when manipulating the data.

With the WRITE command all active arrays from the save buffer are written to a file BKF****.SIN. Here the format is changed back to Integer*2.

BKFIT

TEXT

Command to switch on the graphics text mode at the position

defined by the graphics cursor. Text up to 79 character per line may be entered directly, graphics input mode is terminated by typing <RET> in response to the graphics cursor. Text is displayed in the actual GTINDEX colour.

BKFIT

RECOVER

This command allows to reproduce the last session of BKFIT by reading all commands from the journal file BKFIT.JOU (if saved).

BKFIT

EXIT

Exit of the program to the operating system command level.

BKFIT

READ

Reads single arrays from a data file in Big Karl standard format containing sorted spectra information (*.SIN).

READ filename [arraynumber,...]

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

The filename with extension has to be given. The file must be written in standard BIG KARL format (i.e. collected by MEMPHIS data acquisition system or *.SIN files created by PLSORT or BKFIT). These files contain sorted spectra in a special format that c a n n o t be typed on a terminal or lineprinter. (See DUMP)

You may specify the array numbers you want to read separated by commas or single blanks. If ommitted the programm reads the first 16 arrays of the file. Two dimensional arrays are presently skipped and ignored.

BKFIT

READ

Examples

READ AC0900.SIN 1,2 5

Read Arrays no. 1, 2, and 5 from file 'AC0900.SIN' and store then in the READ buffer. Other arrays in his file will be skipped.

READ AC0900.SIN

The first 16 arrays from the specified file will be read and stored.

BKFIT

SAVE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

Copies selected arrays out of the READ buffer into the SAVE buffer.

SAVE r_arraynumber,... [to s_arraynumber,...]

The arraynumbers may be seperated by blanks or by commas.

BKFIT

SAVE

R_ARRAYNUMBER

R_ARRAYNUMBER selects a certain array from the READ buffer. More than one array can be given in one line. 'ALL' is accepted as a valied parameter if all arrays from the READ buffer are to be transfered to the SAVE buffer.

BKFIT

SAVE

S_ARRAYNUMBER

S_ARRAYNUMBER selects the postion in the SAVE buffer for the arrays. S_ARRAYNUMBER has to be separated by R_ARRAYNUMBER by the word 'TO'. If no S_ARRAYNUMBER is given the SAVE buffer is filled up using all free positions that are available.

If a desired position in the SAVE buffer is already ocupied the program issus a warning and does not save the array. You have to use the DELETE command to free positions in the SAVE buffer.

BKFIT

WRITE

Writes all arrays that are presently in the SAVE buffer to a file in BIG KARL standart form. The Filename is generated using the update facility of BIG KARL in the form of BKFxxxx.SIN.

BKFIT

SHOW

Displays a table of contents of the READ, SAVED or INTEGRATIONS buffer and the setup of the graphic output.
Valid forms of the Command are :

SHOW READ => display contens of READ buffer
SHOW SAVE => display contens of the SAVE buffer
SHOW SET => display settings for graphic output
SHOW INT => display integration calculations

BKFIT

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

DELETE

Deletes array from SAVE buffer.

DEL arraynumber,[....]

Where arraynumber is the number of the array in the SAVE buffer to be deleted. If more than one array number is given they have to be separeted by commas or blanks. 'ALL' is accepted as a valid parameter to clear the whol SAVE buffer.

BKFIT

ADD

ADD {array 1} {array 2} {array 3}

Add the content of array 1 to the content of array 2 (channel by channel) and store the result in array 3.

BKFIT

SUBSTRACT

SUBL {array 1} {array 2} {array 3}

Substract the content of array 2 from the content of array 2 (channel by channel) and store the result in array 3.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKFIT

MULTYPLY

MUL {array 1} {array 2} {array 3}

Multiply the content of array 1 by the content of array 2 (channel by channel) and store the result in array 3.

BKFIT

DIVIDE

DIV {array 1} {array 2} {array 3}

Divide the content of array 1 by the content of array 2 (channel by channel) and store the result in array 3.

BKFIT

AFUNCTION

Add a polinomial function of degree four of the channelnumber to an array (channel by channel).

AFU arraynumber coef_0,[...,coef_4]

Here 'arraynumber' specifies the array from the SAVE buffer. 'coef_0' to 'coef_4' specify the function. Coeficients which are ommited are defaulted to zerro. The result of the above command is:

```
Array(arraynumber) = Array(arraynumber) +
     ( coef_0  +  coef_1*channel_nr.  + ... +  coef_4*channel_nr**4 )
```

BKFIT

SFUNCTION

Substract a polinomial function of degree four of the channelnumber from an array (channel by channel).

```
SFU arraynumber coef_0,[...,coef_4]
```

Here 'arraynumber' specifies the array from the SAVE buffer. 'coef_0' to 'coef_4' specify the function. Coeficients which are ommited are defaulted to zerro. The result of the above command is:

```
Array(arraynumber) = Array(arraynumber) -
     ( coef_0  +  coef_1*channel_nr.  + ... +  coef_4*channel_nr**4 )
```

BKFIT

MFUNCTION

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

Multiply a polinomial function of degree four of the channelnumber with an array (channel by channel).

MFU arraynumber coef_0,[...,coef_4]

Here 'arraynumber' specifies the array from the SAVE buffer. 'coef_0' to 'coef_4' specify the function. Coeficients which are ommited are defaulted to zerro. The result of the above command is:

```
Array(arraynumber) = Array(arraynumber) *
     ( coef_0  +  coef_1*channel_nr.  + ... +  coef_4*channel_nr**4 )
```

BKFIT

DFUNCTION

Divied an array by a polinomial function of degree four of the channelnumber (channel by channel).

DFU arraynumber coef_0,[...,coef_4]

Here 'arraynumber' specifies the array from the SAVE buffer. 'coef_0' to 'coef_4' specify the function. Coeficients which are ommited are defaulted to zerro. The result of the above command is:

```
Array(arraynumber) = Array(arraynumber) /
     ( coef_0  +  coef_1*channel_nr.  + ... +  coef_4*channel_nr**4 )
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKFIT

SET

Changes default settings for graphic output and sets the switch for the user-supplied subroutine BKF_USER .

Till now the program provides only the possibility to SCOPE an array on a graphics terminal and o produce a local hardcopies where available. For output output on the graphics printer or on Calcomp plotter the program ACPLOT must be used. To display the actual setting of parameters use SHOW SET.

Command format:

SET [plot_number] par_name par_value

PLOT_NUMBER specifies for which of the up to 6 simultaneously displayed arrays the change is to be made. If no plot_number is given the change is made for all plots.

PAR_NAME and PAR_VALUE specify the attributes of the plot that have to be changed. Valid parameters that may be changed are:

PLOTNR = number of arrays displayed simultaneusly
XMIN = minimum channel number to be plotted
XMAX = maximum channel number to be plotted
YMIN = minimum y - value to be plotted
YMAX = maximum y - value to be plotted
COMP = channel compress factor

MODE = mode of display (histogram, point plot, panel)

USER_SWITCH = switch passed to subroutine BKF_USER

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

LINE STYLE = line style (solid, dotted, dashed etc.)
LINE INDEX = line colour index (0..7)
GTINDEX = graphics text colour index (0..7)

BKFIT

SET

PLOTNR

SET PLO number_of_plots

This parameter controls the layout for the scope command. You may choose between 6 different layouts for the simultaneus display of 1 up to 6 arrays. The location on the screen and size of the individual plots is fixed for each layout.

BKFIT

SET

XMIN

With XMIN you change the minimum channel number for the display.

SET [plot_number] XMIN channel_number

PLOT_NUMBER specifies for which of the up to 6 simultaneusly displayed plots the change is to be effectiv. If no plot_number is given

the change is made for all plots.

CHANNEL_NUMBER is the new value of the parameter. The program sets a default value of 0.

BKFIT

SET

XMAX

With XMAX you change the maximum channel number for the display.

SET [plot_number] XMAX channel_number

PLOT_NUMBER specifies for which of the up to 6 simultaneusly displayed plots the change is to be effectiv. If no plot_number is given the change is made for all plots.

CHANNEL_NUMBER is the new value of the parameter. The program sets a default value of 0. Then the actual maximum channel to be displayed is taken as the length of the array in the SAVE block.

BKFIT

SET

YMIN

With YMIN you change the minimum channel content for the display.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

SET [plot_number] YMIN channel_contnet

PLOT_NUMBER specifies for which of the up to 6 simultaneusly displayed plots the change is to be effectiv. If no plot_number is given the change is made for all plots.

CHANNEL_CONTENT is the new value of the parameter. The program sets a default value of 0. If both YMIN and YMAX are set to be 0 the program performs an autoscale to display the full arraycontent.

BKFIT

SET

YMAX

With YMAX you change the maximum channel content for the display.

SET [plot_number] YMAX channel_contnet

PLOT_NUMBER specifies for which of the up to 6 simultaneusly displayed plots the change is to be effectiv. If no plot_number is given the change is made for all plots.

CHANNEL_CONTENT is the new value of the parameter. The program sets a default value of 0. If both YMIN and YMAX are set to be 0 the program performs an autoscale to display the full arraycontent.

BKFIT

SET

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

COMPRESS

With COMPRESS you change the compress of an array for display.

SET [plot_number] COM compress_factor

PLOT_NUMBER specifies for which of the up to 6 simultaneusly displayed plots the change is to be effectiv. If no plot_number is given the change is made for all plots.

COMPRESS_FACTOR is the number of channels whose content is summed for display. The program sets a default value of 1.

BKFIT

SET

MODE

With MODE you may change the mode of display.

SET [plot_number] MODE mode_number

PLOT_NUMBER specifies for which of the up to 6 simultaneusly displayed plots the change is to be effectiv. If no plot_number is given the change is made for all plots.

Three modes are available selected by MODE_NUMBER.
Mode 1 : Histogram plot (Default)
Mode 2 : Bar plot
Mode 3 : Point plot

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKFIT

SET

USER_SWITCH

Change the value of the switch passed to user written subroutine BKF_USER.

SET USE*R_SWITCH

USER_SWITCH may be used to select differnet modes of operation of BKF_USER. This way it is possible to perform a number of different tasks with on subroutine. The need to compile new versions of BKFIT for each of this tasks can be greatly reduced this way.

BKFIT

USER

calls user written subroutine BKF_USER. If BKF_USER is not given by the user a dummy subroutine is called.

USE*R {array1} [{array2} {array3}]

{array1}, {array2} and {array3} are the numnbers of the SAVE arrays that are passed to BKF_USER. For this subroutine the following call convention is used.

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
      SUBROUTINE BKF_USER ( USER_SWITCH, U_MAX_SIZE, U_SIZE1, U_ARRAY1,
      1                     U_SIZE2, U_ARRAY2, U_SIZE3, U_ARRAY3)
C
      INTEGER*2 USER_SWITCH, U_MAX_SIZE, U_SIZE1, U_SIZE2, U_SIZE3
      REAL*4    U_ARRAY1(*), U_ARRAY2(*), U_ARRAY3(*)
```

The meaning of the variables is the following:

USRE_SWITCH

input : may be used to select different modes of calculation
change USER_SWITCH with the SET USER command

return: if set to zero prevents any change in SAVE block

U_MAX_SIZE

input : maximum allowed channel number for mofified array

U_SIZE1, U_SIZE2, U_SIZE3

input : length of arrays taken from SAVE block

U_ARRAY1, U_ARRAY2, U_ARRAY3

input : arrays taken from SAVE block

U_SIZE1

return: size of modified array

U_ARRAY1

return: modified array

This Subroutine is only allowed to change the the content and length of {array1}. Before calling BKF_USER it is checked wether this array is allready used. If so you have to confirme that you want to change it.

On return from BKF_USER it is check wether U_SIZE1 is of a reasonable size and if USER_SWITCH is greater or equal 0. Only if this conditions are fullfilled the changes in the SAVE block are made.

BKFIT

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

SCOPE

Display arrays on screen of graphic terminals.

SCO*PE array_1, [array_2, ..., array_6]

Up to six arrays are simultaneusly displayed acording to the PLOT_NUMBER set before. The layout for the display is controled by the SET command.

BKFIT

DUMP

DUM*P array

The DUMP command writes the content of the specified array from the save block to the file BKFDUMP.LIS. This file can be used for listing on a terminal or output on the lineprinter.

It also offers a simple format to transfere data to programs which do not offer the possibility to read *.SIN files.

BKFIT

COMPRESS

COM*PRESS array factor

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

In contrast to the SET COM*PRESS comand, which is only relavant for the display of an array, this command actualy changes the content of the given array in the Save block. The compress factor may be any real number latrger then 1.

BKFIT

SHIFT

SHI*FT array channelnumber

With this command it is possible to shift the contence of the given array. A negative value for channellnumer means a shift to the left a positive number a shift to the right. If channelnumber is positiv (negative) the elements on the right (levt) side of the array are lost, the elemts on the left (right) side are set to 0. Losing array elements by a shift to the right can be prevented by extending the size of the array with the CON*CATENATE command.

BKFIT

CONCATENATE

CON*CATENATE arr#1 arr#2 arr#3

A new array (arr#3) is created wich length is the sum of the lengt of arr#1 and arr#2. It contains the elements of arr#1 in the its first part and the elements of arr#2 in the second part.

A special form of this command can be choosen by giving arr#2 = 0.

Then arr#3 is interpreted as channel number and arr#1 is extendet by arr#3 channels. This channels are all set to 0. If arr#3 is negative arr#1 is truncated by arr#3 channels.

BKFIT

CLEAR

CLE*AR used to clear the graphic display

BKFIT

BATCH

BAT*ch filename

With this command input to the program it can be changed to a batchfile given by filename. The command format of this file is identical to the interactive command format. The last command in the batchfile has to be END*BATCH to switch command input back to terminal input.

BKFIT

ENDBATCH

END*BATCH

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

Switch input back to terminal input from a command batchfile

BKFIT

INTEGRATE

INT*EGRATE arraynumber xlow xhigh

With this command input to the program necessary integration-values are calculated between XLOW and XHIGH. Therefore XLOW is the minimum channel content and XHIGH the maximum. All calculationvalues are saved in the INTEGRATION buffer.

In detail you gets the INTEGRALSUM,the PEAKPOSITION, SIGMA, FWHM and the SKEWNESS of the specified array between the xlimits.

BKFIT

OVERLAY

OVE*RLAY array_1, [array_2, ..., array_6]

Up to six arrays are simultaneusly displayed according to the PLOT_NUMBER set before. The difference between SCOPE and OVERLAY is that SCOPE displays a whole layout with labels, axis, tic marks and the data curve during OVERLAY only draws the actual data curve of the specified array. So, OVERLAY is usefull to displays multiple arrays in the same picture-window in example to compare those arrays.

If you want to overlay for example only one arrays on the second position use a / for the first arrays which should not be

overlayed by an array.

OVE*RLAY /, [array, ...]

BKFIT

OVERLAY

EXAMPLES

OVERLAY 1 2 3 4

The data curve of the arrays 1,2,3,4 out of the SAVED buffer are displayed on the first four positions.

OVERLAY / 5 // 13

The data curve of array 5 is displayed on the second position during the data curve of array 13 is displayed on the fifth position. The first, third and fourth position are skipped.

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP BKLIB (14 July 1986):

BKLIB

```
***************
*  B K L I B  *
***************
```

Big Karl user libraries on BKLIB:

Object libraries:

General purpose:

BKUTY.OLB	terminal I/O, data I/O and system support
BKMAT.OLB	mathematical utilities (MATRIX)

Graphics:

AGII.OLB	Tektronix Advanced Graphing II (I4)
PLOT10.OLB	Tektronix Terminal Control System TCS (I4)
GMAGII.OLB	Advanced Graphing II modified for GMA (NOI4)
GMA10.OLB	Terminal Control System modified for GMA (NOI4) and colour terminal enhancement support
CALCOMP.OLB	Calcomp model 1012 plotter package (terminal line)
CALTRON.OLB	Calcomp model 1012 plotter package emulated on with: CALTRON.DAT character definition file
IGM1DG.OLB, IGM3DG.OLB, IGMGRP.OLB, IGMUTY.OLB	Interactive Graphics Monitor link library

Data analysis:

BKFIT.OLB	BKFIT/BKMERGE link library

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

MINUIT.OLB MINFIT.OLB	Minuit with Chisquare FCN library
MOCAL.OLB	MOCAL Morris chamber calibration link library
PLSORT.OLB	PLSORT sorting utility link library with : PLCOMM.FOR include file BKCOMM.FOR include file
ACQINI.OLB	Acquire initialisation library
ACQUIRE.OLB	Acquire main process link library
ACQUIRERT.OLB	Acquire real time subprocess library with: ACQUIRERT.BIN object module
FOWL.BIN	Object link module for CERN FOWL program
SBMASS.BIN, TMASS.BIN	Wapstra table object modules

Special device support:

CAMAC.OLB	CAMAC library (ZEL)

****

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKLIB

BKUTY

```
************************
*  Library:  B K U T Y  *
************************
```

BIG KARL UTILITY SUBROUTINES

The following modules are available in BKLIB:BKUTY/LIBR

FILUPD	automatic file name creation utility
LINEPLOT	produce a plot on a non-graphics terminal/printer
BK_R_SIN	read singles spectra in ACQUIRE standard format
BK_W_SIN	write singles spectra in ACQUIRE standard format
BK_R_DATA	read data files in ACQUIRE standard format
BK_W_DATA	write data files in ACQUIRE standard format
BK_DECODE	decode MEMPHIS events from buffer word
BK_CPU_TIME	provide process CPU time used and left
BK_WAIT	hibernate process for a given absolute time
BK_RAN_SEED	get a random value for RAN starting seed
BK_TT_MODE	transparent terminal configuration (type unknown)
BK_TT_CONFIG	configure known terminal-type device
BK_TT_TYPE	get device or terminal type from system
BK_GET_PAR	get foreign command parameter list
BK_TT_AST	terminal <Ctrl-Y> AST routine
BK_TRNLOG	repetitive translate logical device name

Format free terminal input:

RDSHOW	example of program using free input command parsing
RDCMD	free input command parser with batch/logging/journal mode
RDPAR	read a parameter with optional keyword and prompting
RDPRMT	forced read of a prompted parameter value

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

RD_HELP acces private HELP library
RDCOMP simularity factor for error-tolerant terminal input
RDCONV pack/unpack text arrays and convert lower- to upper case

RDSET set mode for next reading
RDTEXT read a text string terminated by blank
RDALL read a text line including blanks
RDCOMT read a comment line enclosed in apostrophs
RDDBLE read a REAL*8 number
RDFIX read an INTEGER*4 number
RDFLT read a REAL*4 number

****

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

```
BKLIB

  BKUTY

    BK_CPU_TIME

      CC
      CC  FILE: BKCPUTIME.FOR     GET CPU TIME VALUES
      CC  ===================     J.MEISSBURGER, 6-NOV-1985
      CC
      CC  CALL BK_CPU_TIME ( TIME_USED, TIME_LEFT)
      CC
      CC  REAL*4 TIME_USED = CPU time used so far by the calling process
      CC  REAL*4 TIME_LEFT = CPU time left for the calling process
      CC
      CC  All times are in seconds. If there is no time limit the
      CC  TIME_LEFT = - TIME_USED (e.g. less or equal zero)
      CC
      CC ***************************************************************


BKLIB

  BKUTY

    BK_RAN_SEED

      CC
      CC
      CC  FILE: BKRANSEED.FOR     Get random seed for Fortran random
      CC  ===================     number generator
      CC                          J.Meissburger , 4-Feb-1986
      CC
      C
      C   SUBROUTINE BK_RAN_SEED (SEED)
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
CC
C   INTEGER*4        SEED
C
CC
CC Input arguments: none
CC
CC Return arguments:         SEED = integer value to be used
CC                          as starting seed for calls
CC                          to Fortran function RAN
CC
CC Note:
CC          The calling sequence for a Fortran program using
CC          BK_RAN_SEED would be:
CC
CC          main program
CC
CC          INTEGER*4 SEED
CC          .....
CC
CC          CALL BK_RAN_SEED (SEED) ! call once at beginning !
CC          .....
CC
CC          R = RAN(SEED)           ! call any number of times!
CC
CC ***************************************************************
```

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKLIB

BKUTY

RDCMD

```
CC
CC
CC  F I L E :   RDCMD.FOR           COMMAND PARSER
CC  ====================            J.MEISSBURGER 18-MAY-83
CC
CC
C   SUBROUTINE RDCMD(CMDS,LCMDS,NCMDS,PROMPT,
C     *                    CMD,NCMD,LFLAG)
CC
CC Read a command string prompting with PROMPT and return the first
CC four characters in CMD together with the command number NCMD.
CC (NCMD is to be used for command parsing in a computed GOTO)
CC
CC A question mark '?' as first character on line produces a list
CC of all commands in array CMDS , a semicolon ';' or exclamation
CC point '!' will ignore the entire line as comment string (which
CC nevertheless will be written to batch output if enabled)
CC
CC If an invalid commands is found in program level batch mode,
CC the mode is changed to interactive and remaining commands are
CC skipped.
CC NCMD = 0 is returned when an End Of File is encountered on
CC command input. Control must  n o t  return to RDCMD after
CC EOF to avoid loops for jobs running in DCL batch mode !
CC
CC LFLAG is a connecting link between the command parser and the
CC called command service routines. It should be returned to RDCMD by
CC all routines as:
CC  LFLAG   =       2       on very first entry to RDCMD
```

```
CC          =       1       on success
CC          =       0       on error in service routine handled
CC                          by the routine itself (message)
CC          =      -1       on unspecific illegal command
CC
CC
CC Input arguments:
CC  INTEGER*4 CMDS(NCMDS)   list of accepted commands
CC  INTEGER*4 LCMDS(NCMDS)  length of command to be checked for match
CC  INTEGER*4 NCMDS         total number of commands
CC  INTEGER*4 PROMPT        prompting symbol (3 characters)
CC  INTEGER*4 LFLAG         see above, also return argument !
CC
CC Return arguments:
CC  INTEGER*4 CMD           command symbol
CC  INTEGER*4 NCMD          command number in list
CC  INTEGER*4 LFLAG         see above, also input argument !
CC
CC ***************************************************************
CC
```

BKLIB

BKUTY

RDPRMT

```
CC
CC
CC  F I L E :   RDPRMT.FOR          PROMPTED READ OF A PARAMETER VALUE
CC  ======================          J.MEISSBURGER 26-MAY-83
CC
C   SUBROUTINE RDPRMT (PROMPT,LENGTH,MODE,MAXBYT,VAL,IFLAG)
CC
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
CC
CC  Read a parameter value:
CC  The parameter value will be read according to the desired MODE.
CC  If a parameter value is not found, or it's type is found to be
CC  wrong,
CC  or IFLAG is set to -1 on entry to RDPRMT
CC  the value will be prompted by the text string PROMPT.
CC
CC  INPUT ARGUMENTS:
CC  BYTE PROMPT(*)           prompting text
CC  INTEGER*4 LENGTH         length of prompt text in bytes
CC  INTEGER*4 MODE           type of desired return argument
CC                           = 0     text string
CC                           = 1     I2
CC                           = 2     I4
CC                           = 3     R4
CC                           = 4     R8
CC  INTEGER*4 MAXBYT         maximum number of characters returned
CC                           in mode = 0
CC  INPUT/RETURN ARGUMENTS:
CC  IFLAG                    -1 to force prompting
CC                        >= 0 otherwise
CC
CC  RETURN ARGUMENTS:
CC  VAL              =       parameter value (byte, I2, I4, R4 or R8 resp.)
CC  INTEGER*4 IFLAG =         -1     on error
CC                            0     success
CC                           >0     number of bytes returned in MODE = 0
CC
CC ***************************************************************************
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKLIB

BKUTY

RDPAR

```
CC
CC
CC  F I L E :   RDPAR.FOR          READ A PARAMETER KEYWORD AND VALUE
CC  ====================           J.MEISSBURGER 6-MAR-1985
CC
C   SUBROUTINE RDPAR(PARNAM,LENGTH,MODE,MAXBYT,VAL,IFLAG)
CC
CC
CC  Read a parameter name and value:
CC  The optional parameter name if found will be skipped, the
CC  parameter value will be read according to the desired MODE.
CC  If a parameter value is not given the parameter name is
CC  used to prompt for a value.
CC
CC  INPUT ARGUMENTS:
CC  BYTE PARNAM()    =       optional parameter name
CC  INTEGER*4 LENGTH         length of parameter name in bytes
CC  INTEGER*4 MODE           type of desired return argument
CC                           = 0     text string
CC                           = 1     I2
CC                           = 2     I4
CC                           = 3     R4
CC                           = 4     R8
CC  MAXBYT                   = max. number of characters returned in
CC                           mode = 0
CC
CC  RETURN ARGUMENTS:
CC  VAL              =       parameter value (byte, I2, I4, R4 or R8 resp.)
CC  INTEGER*4 IFLAG =         -1     on error
```

```
      CC                            0      success
      CC                           >0      number of bytes returned in MODE = 0
      CC
      CC ***************************************************************************
      CC
```

BKLIB

BKUTY

RDCONV

```
      CC
      CC
      CC  F I L E :   RDCONV.FOR          CONVERT CHARACTER DATA TYPES
      CC  ======================          J.MEISSBURGER 16-AUG-82
      CC
      C   SUBROUTINE RDCONV(ARR1,NCHAR,MODE,ARR2,IFLAG)
      CC
      CC PACK OR UNPACK CHARACTERS STORED IN ARRAY ARR1 INTO ARR2
      CC ACCORDING TO THE DATA TYPE SPECIFIED BY MODE.
      CC
      CC IFLAG = 0 IS RETURNED FOR SUCCESS, -1 FOR ERROR.
      CC
      CC Input arguments:
      CC  ARR1             =       input array (BYTE, I2 or I4 resp.)
      CC  INTEGER*4 NCHAR  =       number of characters in input array
      CC  INTEGER*4 MODE   =       0 - lower case to upper case (a .. z --> A .. Z)
      CC                           1 - BYTE to I2 with zero padding
      CC                           2 - BYTE to I4 with zero padding
      CC                           3 - I2 to I4   with zero padding
      CC                           4 - I2 to BYTE
      CC                           5 - I4 to BYTE
      CC                           6 - I4 to I2
```

```
      CC
      CC Return arguments:
      CC  ARR2            =       output array (BYTE, I2 or I4 resp.)
      CC  INTEGER*4 IFLAG =       -1 for ERROR, 0 for success
      CC
      CC ***************************************************************************
      CC
```

BKLIB

BKUTY

RDCOMP

```
      CC
      CC
      CC
      CC  F I L E :   RDCOMP.FOR          SIMULARITY COMPARATOR
      CC  ======================          J.MEISSBURGER 23-OCT-79
      CC
      CC
      C   SUBROUTINE RDCOMP(TEXT1,NBYT1,TEXT2,NBYT2,P)
      CC
      CC
      CC COMPARE TWO TEXT STRINGS AND CALCULATE A SIMULARITY FACTOR
      CC GIVEN IN PERCENT. THIS MAY BE USED IN COMMAND PARSING  PROVIDING
      CC A SUFFICIENTLY HIGH DEGREE OF REDUNDANCY ( >4 CHARACTERS )
      CC
      CC INPUT ARGUMENTS:
      CC  BYTE TEXT1(),TEXT2()    TWO TEXT STRINGS TO COMPARE
      CC  INTEGER*4 NBYT1,NBYT2   LENGTH OF TWO STRINGS IN BYTES
      CC
      CC RETURN ARGUMENTS:
      CC  REAL*4 P                PERCENTAGE OF SIMULARITY
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
      CC
      CC ***************************************************************************
      CC
```

```
BKLIB

  BKUTY

    RD_HELP

      CC
      CC
      CC  F I L E :   RDHELP.FOR          GET KEYED HELP INFORMATION
      CC  ======================          OUT OF A (USER-) HELP LIBRARY
      CC                                  J.MEISSBURGER 14-DEC-82
      CC Version: 3-Jul-1986
      CC New: System VMS 4.3 and higher: Use Group specific HELP library
      CC                              e.g. BKLIB:BIGKARL.HLB
      CC
      C   SUBROUTINE RD_HELP (help_library, level_1_key)
      CC
      CC
      CC >>>      This routine runs only under VAX-11 VMS
      CC
      CC  This subroutine is to be called after a HELP command at
      CC program command level. It opens the HELP library help_library
      CC ('help_library.HLB') and searches for a level-1 key "level_1_key".
      CC which usually is identical to the application program name.
      CC
      CC Input arguments:
      CC  help_library    character string containing the name of the
      CC                  desired HELP library (*.HLB)
      CC                  (e.g. help_library='BKLIB:BIGKARL')
```

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

```
CC  level_1_key     character string giving the level-1 key,
CC                  usually the name of the calling appli-
CC                  cation program (e.g. level_1_key='PLSORT')
CC
CC Return arguments:
CC  none
CC
CC For additional information see example: $BKHelp RDSHOW...
CC ************************************************************************
CC
```

BKLIB

BKUTY

RDSET

```
CC
CC
CC
CC  F I L E :   RDSET.FOR           SET READING CONDITIONS
CC  ====================            AND POINTERS
CC                                  J.MEISSBURGER 15-OCT-79
CC VERS: 7-FEB-1986
CC
C   SUBROUTINE RDSET(IDSET, IVAL, IFLAG)
CC
CC
CC SET AND RETURN OPERATING MODES OF FREE STYLE INPUT ROUTINES RD...
CC
CC INPUT ARGUMENTS:
CC  INTEGER*4 IDSET         MODE SWITCH
CC
CC INPUT/RETURN ARGUMENTS:
```

```
CC  INTEGER*4 IVAL, IFLAG   ACCORDING TO FOLLOWING LIST
CC
CC
CC IDSET = 0        INITIALISE LOGICAL UNITS AND DISABLE BATCH MODES
CC          INPUT PARAMETERS:
CC          IVAL  = LOG. UNIT FOR TERMINAL INPUT  (DEFAULT=5)
CC          IFLAG = LOG. UNIT FOR TERMINAL OUTPUT (DEFAULT=6)
CC
CC IDSET = 1        SKIP REMAINING CHARACTERS AND PREPARE FOR READING AT THE
CC          BEGINNING OF THE NEXT RECORD (LINE)
CC          RETURN PARAMETERS:
CC          IVAL  = ACTUAL RECORD POINTER OR RECORD JUST READ
CC          IFLAG = -1
CC
CC IDSET = 2        RETURN ACTUAL TEXT AND RECORD POINTERS
CC          RETURN PARAMETERS:
CC          IVAL  = TEXT POINTER POSITION IN THE CURRENT LINE
CC          IFLAG = RECORD POINTER VALUE
CC
CC IDSET = 3        SET TEXT AND RECORD POINTERS
CC          INPUT PARAMETERS:
CC          IVAL  = NEW TEXT POINTER VALUE
CC          IFLAG = NEW RECORD POINTER VALUE
CC
CC IDSET = 4        SWITCH INPUT BATCH MODE
CC          INPUT PARAMETERS:
CC          IVAL  <= 0 SWITCH BATCH MODE OFF
CC          IVAL  >  0 ENABLE BATCH MODE FROM LOG. UNIT IVAL
CC
CC IDSET = 5        RETURN END OF FILE CONDITION ON INPUT
CC          RETURN PARAMETERS:
CC          IVAL  = ACTUAL RECORD POINTER
CC          IFLAG =  0  IF NO END OF FILE,
CC          IFLAG = -1  IF END OF FILE WAS FOUND ON INPUT
CC
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
CC IDSET = 6        SWITCH OUTPUT LOGGING MODE (with INPUT LINE ECHO)
CC          INPUT PARAMETERS:
CC          IVAL  <= 0 SWITCH BATCH MODE OFF
CC          IVAL  >  0 ENABLE OUTPUT BATCH MODE TO UNIT IVAL
CC
CC IDSET = 7        RESET TEXT POINTER BY ONE POSITION
CC          PARAMETERS: NONE
CC
CC IDSET = 8        SWITCH LIST KEY (TERMINAL ECHO IN INPUT BATCH MODE)
CC          INPUT PARAMETER:
CC          IVAL >= 0 SWITCH OUTPUT LISTING ON
CC          IVAL  < 0 SWITCH OUTPUT LISTING OFF
CC
CC IDSET = 9        SWITCH COMMAND INPUT JOURNAL MODE (Output)
CC          INPUT PARAMETERS:
CC          IVAL  <= 0 SWITCH JOURNAL MODE OFF
CC          IVAL   > 0 ENABLE JOURNAL MODE ON UNIT IVAL
CC
CC IDSET = 10       SWITCH COMMAND ERROR MODE FOR JOURNAL INPUT
CC          IVAL  <= 0 COMMAND INPUT ABORTED ON ERROR
CC          IVAL   > 0 COMMAND INPUT CONTINUED ON ERROR
CC
CC ***************************************************************************
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKLIB

BKUTY

RDTEXT

```
CC
CC
CC
CC  F I L E   RDTEXT.FOR              READ A TEXT STRING
CC  ====================              TERMINATED BY BLANK
CC                                    J. MEISSBURGER 15-OCT-79
CC
CC
C       SUBROUTINE RDTEXT (TEXT,NBYTES,MAXBYT,IFLAG)
CC
CC READ AN ASCII STRING OF UP TO 80 CHARACTERS TERMINATED BY BLANK
CC
CC NBYTES IS THE NUMBER OF CHARACTERS READ
CC IF THERE IS NO CHARACTER DIFFERENT FROM BLANK ON THE LINE IFLAG
CC IS SET TO -1
CC INPUT OF UP TO MAXBYT CHARACTERS PRODUCES IFLAG = 0
CC IF THERE ARE MORE THAN MAXBYT CHARACTERS IFLAG IS SET TO +1
CC AND THE REMAINING CHARACTERS ARE SKIPPED
CC
CC THE CHARACTER STRING IS STORED IN THE BYTE ARRAY TEXT
CC
CC INPUT ARGUMENTS:
CC  INTEGER*4 MAXBYT          MAXIMUM NUMBER OF BYTES TO BE STORED
CC
CC RETURN ARGUMENTS:
CC  BYTE TEXT()               BYTE ARRAY CONTAINING TEXT STRING
CC  INTEGER*4 NBYTES          NUMBER OF CHARACTERS READ
CC  INTEGER*4 IFLAG           RETURN FLAG
CC
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
      CC ***************************************************************************
      CC
```

BKLIB

BKUTY

RDALL

```
      CC
      CC
      CC
      CC  F I L E   RDALL.FOR              READ A CHARACTER STRING
      CC  ==================               TO END OF LINE
      CC                                   J. MEISSBURGER 29-NOV-79
      CC
      CC
      C         SUBROUTINE RDALL (TEXT,NBYTES,MAXBYT,IFLAG)
      CC
      CC
      CC READ AN ASCII STRING OF UP TO 80 CHARACTERS INCLUDING BLANKS
      CC
      CC NBYTES IS THE NUMBER OF CHARACTERS READ
      CC IF THERE IS NO CHARACTER ON THE LINE, IFLAG
      CC IS SET TO -1
      CC INPUT OF UP TO MAXBYT CHARACTERS PRODUCES IFLAG = 0
      CC IF THERE ARE MORE THAN MAXBYT CHARACTERS IFLAG IS SET TO +1
      CC AND THE REMAINING CHARACTERS ARE SKIPPED
      CC
      CC THE CHARACTER STRING IS STORED IN THE BYTE ARRAY TEXT
      CC
      CC INPUT ARGUMENTS:
      CC  INTEGER*4 MAXBYT
      CC
```

```
      CC RETURN ARGUMENTS:
      CC  BYTE TEXT(80)
      CC  INTEGER*4 NBYTES, IFLAG
      CC
      CC ***************************************************************************
      CC
```

BKLIB

BKUTY

RDCOMT

```
      CC
      CC
      CC
      CC  F I L E :   RDCOMT.FOR          READ A COMMENT STRING
      CC  ======================          ENCLOSED IN APOSTROPHS
      CC                                  J. MEISSBURGER 15-OCT-79
      CC
      CC
      C         SUBROUTINE RDCOMT (COMT,NBYTES,NMAX,IFLAG)
      CC
      CC
      CC READ A TEXT STRING OF UP TO 79 CHARACTERS ENCLOSED IN APOSTROPHS (')
      CC
      CC NBYTES IS THE NUMBER OF CHARACTERS READ AFTER THE FIRST APOSTROP
      CC IF THE FIRST NONBLANK CHARACTER ON THE LINE IS NOT AN APOSTROPH,
      CC IFLAG IST SET TO -1
      CC INPUT OF UP TO NMAX CHARACTERS PRODUCES IFLAG = 0
      CC IF THERE ARE MORE THAN NMAX CHARACTERS IFLAG IS SET TO +1
      CC AND THE REMAINING CHARACTERS ARE SKIPPED UP TO THE NEXT APOSTROPH
      CC
      CC THE CHARACTER STRING IS STORED IN THE BYTE ARRAY COMT
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
      CC
      CC INPUT ARGUMENTS:
      CC  INTEGER*4 NMAX          MAXIMUM NUMBER OF CHARACTERS STORED
      CC
      CC RETURN ARGUMENTS:
      CC  BYTE COMT()             TEXT STRING ENCLOSED IN APOSTROPH
      CC  INTEGER*4 NBYTES        NUMBER OF CHARACTERS READ IN
      CC  INTEGER*4 IFLAG         STATUS FLAG
      CC
      CC ***************************************************************************
      CC
```

BKLIB

BKUTY

RDFIX

```
      CC
      CC
      CC
      CC  F I L E :  RDFIX.FOR            READ AN INTEGER*4
      CC  ====================            J.MEISSBURGER 15-OCT-79
      CC
      CC
      C   SUBROUTINE RDFIX (IVAL, ISIG, IFLAG)
      CC
      CC
      CC READ AN INTEGER*4 IN FREE FORMAT GIVING ABSOLUTE VALUE
      CC AND SIGN (+ OR - 1) INCLUDING ZEROES
      CC
      CC IFLAG IS SET TO ZERO IF A VALID INPUT WAS FOUND.
      CC IF THE INPUT WAS INVALID, IFLAG IS SET TO -1 AND THE TEXT
      CC POINTER IS REPOSITIONED TO THE BEGINNING OF THE TEXT STRING
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
      CC
      CC INPUT ARGUMENTS:
      CC  NONE
      CC
      CC RETURN ARGUMENTS:
      CC  INTEGER*4 IVAL          ABSOLUTE NUMBER VALUE (TRUNCATED INTEGER)
      CC  INTEGER*4 ISIG          SIGN (+ AND - ZERO HAVE DIFFERENT SIGN !)
      CC  INTEGER*4 IFLAG         -1 FOR ERROR, 0 FOR SUCCESS
      CC
      CC ***************************************************************************
      CC
```

BKLIB

BKUTY

RDFLT

```
      CC
      CC
      CC
      CC  F I L E   RDFLT.FOR             READ A REAL*4 FLOATING POINT
      CC  ==================              NUMBER
      CC                                  J.MEISSBURGER 24-OCT-79
      CC
      CC
      C   SUBROUTINE RDFLT (VAL,SIG,IFLAG)
      CC
      CC
      CC READ A REAL*4 FLOATING POINT NUMBER GIVING ABSOLUTE VALUE
      CC AND SIGN (+ OR - 1.) INCLUDING ZEROES
      CC
      CC IFLAG IS SET TO ZERO IF A VALID INPUT WAS FOUND.
      CC IF THE INPUT WAS INVALID IFLAG IS SET TO -1 AND THE
```

```
      CC TEXT POINTER IS REPOSITIONED TO THE BEGINNING OF THE TEXT STRING
      CC
      CC INPUT ARGUMENTS:
      CC  NONE
      CC
      CC RETURN ARGUMENTS:
      CC  REAL*4 VAL              NUMBER ABSOLUTE VALUE
      CC  REAL*4 SIG              SIGN (+ AND - ZERO HAVE DIFFERENT SIGN !)
      CC  INTEGER*4 IFLAG         -1 FOR ERROR, 0 FOR SUCCESS
      CC
      CC ***************************************************************************
      CC
```

BKLIB

BKUTY

RDDBLE

```
      CC
      CC
      CC
      CC  F I L E   RDDBLE.FOR            READ A REAL*8 FLOATING POINT
      CC  ====================            NUMBER
      CC                                  J.MEISSBURGER 17-OCT-79
      CC
      CC
      C   SUBROUTINE RDDBLE (DVAL, DSIG, IFLAG)
      CC
      CC
      CC READ A REAL*8 FLOATING POINT NUMBER GIVING ABOLUTE VALUE
      CC AND SIGN (+ OR - 1D0) INCLUDING ZEROES
      CC
      CC IFLAG IS SET TO ZERO IF A VALID INPUT WAS FOUND.
```

```
      CC IT THE INPUT WAS INVALID, IFLAG IS SET TO -1 AND THE
      CC TEXT POINTER IS REPOSITIONED TO THE BEGINNING OF THE TEXT STRING
      CC
      CC INPUT ARGUMENTS:
      CC  NONE
      CC
      CC RETURN ARGUMENTS:
      CC  REAL*8 DVAL              NUMBER.ABSOLUTE VALUE
      CC  REAL*8 DSIG              SIGN (+ AND - ZERO HAVE DIFFERENT SIGNS !)
      CC  INTEGER*4 IFLAG          -1 FOR ERROR, 0 FOR SUCCESS
      CC
      CC ***************************************************************************
      CC
```

BKLIB

BKUTY

SBMASS

```
      CC
      CC  F I L E :   SBMASS.FOR          Return a mass value from
      CC       ====================            the WAPSTRA 77 mass table
      CC                                       I.KATAYAMA 29-JUN-81
      CC                                       B.BRINKMOELLER 11.10.83
      CC                                       added symbol for neutron
      CC
      C   SUBROUTINE SBMASS(IA,IZ,AT,ATE,NORAT,SYMBOL)
      CC
      CC MASS TABLE IS REPLACED TO NEW WAPSTRA TABLE('77),
      CC WHICH WAS TYPED-IN AND CHECKED BY DR.YAMAZAKI10
      CC AT RCNP,OSAKA UNIVERSITY.
      CC
      CC The mass value is returned according to the interger charge and
```

```
CC mass values. If a negative charge is given a search for the
CC given symbol is made in the table of chemical symbols.
CC
CC  INPUT:  IA      integer mass number
CC          IZ      integer nuclear charge number (or SYMBOL)
CC          SYMBOL  chemical symbol of element (or IZ)
CC
CC  OUTPUT: AT      nuclear mass less electron masses
CC               ATE     atomic mass including electron
CC          IZ      integer nuclear charge number (or SYMBOL)
CC          SYMBOL  chemical symbol of element (or IZ)
CC  FLAG:   NORAT   =1  mass value found
CC                  =0  not found
CC
CC Use LINK ...,BKLIB:sbmass.bin,tmass.bin,.... to access this routine
CC
```

BKLIB

BKUTY

FILUPD

```
CC
CC  F I L E :   FILUPD.FOR          UPDATE SYS-FILE AND RETURN
CC  ======================          NEXT FILENAME
CC                                  J.MEISSBURGER 11-AUG-82
CC
C   SUBROUTINE FILUPD(SYSFIL,NBYT,LSYS,INCR,FILNAM)
CC
CC*****************************************************************
CC
CC  BYTE SYSFIL(NBYT),FILNAM(12)
CC  INTEGER LSYS,INCR,NBYT
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
      CC
      CC  input arguments:
      CC  SYSFIL  =       name of system file containing the updated
      CC                  file names. The file name in this system
      CC                  file will be used by the calling program
      CC                  in its subsequent OPEN statement.
      CC                  Example: 'USERSYS:ACAxxx.SYS'   where
      CC                  USERSYS = logic name of system file directory
      CC                  AC      = identifier for calling program ACquire
      CC                  A       = machine identifier VAX I (B for VAX II)
      CC  NBYT    =       length of system file name in bytes
      CC  LSYS    =       log. unit to temporarely open system file
      CC  INCR    =       increment by which numeric field of file name is
      CC                  modified (may be positive, zero or negative)
      CC
      CC  return arguments:
      CC  FILNAM  =       updated filename to be used in OPEN statement
      CC
      CC*****************************************************************
      CC
```

BKLIB

BKUTY

LINEPLOT

```
      CC*****************************************************************
      CC
      CC  F I L E :   LINEPLOT.FOR        PLOT ON LINE-PRINTER
      CC  ========================        W. HUERLIMANN
      CC
      CC*****************************************************************
      CC
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
      CC  SUBROUTINE LINPLT(XEX,YEX,SIGEX,NEX,XTH,YTH,NTH,NSIZE,SYMBOL,
      CC     *                    THEORY,TEXTX,TEXTY1,TEXTY2)
      CC
      CC  NTH>0 :  PLOT WITH GIVEN THEORETICAL POINTS
      CC  NTH=0 :  NO THEORETICAL POINTS
      CC  NTH<0 :  CALCULATE THEORETICAL POINTS USING REAL*4 FUNCTION THEORY
      CC       (TO BE DECLARED EXTERNAL IN CALLING PROGRAM)
      CC
      CC  COMMON /INOUT/ NIN,NOUT
      CC
      CC ***************************************************************
      CC
```

BKLIB

BKUTY

BK_R_SIN

```
      CC
      CC  FILE: BKRSIN.FOR        Read singles spectra (arrays) in
      CC  ================        Big Karl data format (ACQUIRE)
      CC                          J.Meissburger 2-FEB-83
      CC                          B.BRINKMOELLER 1-MAR-1985
      CC 15-DEC-1985 B.Brinkmoeller :
      CC changed to support REAL*4 data type and 2-dim arrays
      CC
      CC
      C   SUBROUTINE BK_R_SIN (LUN, FILENAME, ID,
      C     *                       MAX_NO_ARRAYS, MAX_LEN_ARRAYS, MAX_NO_COND,
      C     *                       NO_OF_ARRAYS, ARRAY_NUMBER, ARRAY,
      C     *                       TYPE, PARAM, SIZE, GAIN, OFFSET,
      C     *                       PARAM2, SIZE2, GAIN2, OFFSET2,
      C     *                       CONDITIONS, C_PAR, C_LOL, C_HIL,
```

```
C     *                          DAYTIME, LCOMM, COMMENT, IFLAG)
CC
CC Input arguments:
C   INTEGER*2 LUN             !       Fortran logical unit number
C   CHARACTER*(*) FILENAME    !       name of file to read
C   INTEGER*2 ID              !       typ of data desired
C   !       if ID = 'RE','LZ','PL' the routine will read all 1-dim
C   !               arrays and convert them to R*4, I*4 or I*2
C   !       if ID = '2R','2L','2D' the routine will read all
C   !               low resolution (R*4,I*4,I*2) 2-dim arrays
C   !               and convert them to R*4, I*4 or I*2
C   !       if ID = '28','24','22','21' the routine will read all
C   !               high resolution (8Bit, 4Bit, 2Bit, 1Bit)
C   !               2-dim arrays without conversion
C   !       if ID = '2 ' the routine will read all 2-dim arrays
C   !               without conversion
C
C   INTEGER*2 MAX_NO_ARRAYS !       maximum number of arrays
C           INTEGER*4 MAX_LEN_ARRAYS!       maximum length of arrays
C                             !       meassured in longwords
C   INTEGER*2 MAX_NO_COND     !       maximum number of conditions
CC
CC Input and/or return arguments:
C   INTEGER*2 NO_OF_ARRAYS    !       total number of arrays found /
C                             !       number of arrays to read
C                             !       0 => read all arrays
C   INTEGER*2 ARRAY_NUMBER(MAX_NO_ARRAYS)
C                             !       array numbers desired / found
C   INTEGER*2 LCOMM           !       maximum length of comment to be
C                             !       passed / length of comment passed
CC
CC Return arguments:
C   INTEGER*4 ARRAY(MAX_LEN_ARRAYS,MAX_NO_ARRAYS)
C                                     !       array channel content
C   INTEGER*2 TYPE   (MAX_NO_ARRAYS) !       array ID as passed
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
C
C   INTEGER*2 PARAM  (MAX_NO_ARRAYS) !      parameter number (ADC)
C   INTEGER*2 SIZE   (MAX_NO_ARRAYS) !      array size (channels)
C   INTEGER*2 GAIN   (MAX_NO_ARRAYS) !      ADC gain
C   INTEGER*2 OFFSET (MAX_NO_ARRAYS) !      channel offset (origin)
C
C   INTEGER*2 PARAM2 (MAX_NO_ARRAYS) !      parameter number (ADC)
C   INTEGER*2 SIZE2  (MAX_NO_ARRAYS) !      array size (channels)
C   INTEGER*2 GAIN2  (MAX_NO_ARRAYS) !      ADC gain
C   INTEGER*2 OFFSET2(MAX_NO_ARRAYS) !      channel offset (origin)
C                                    !      only used for 2-dim arrays
C
C   INTEGER*2 CONDITIONS(MAX_NO_ARRAYS)
C                                    !      number of conditions (gates)
C   INTEGER*2 C_PAR(MAX_NO_COND,MAX_NO_ARRAYS)
C                                    !      condition parameter (up to 16)
C   INTEGER*2 C_LOL(MAX_NO_COND,MAX_NO_ARRAYS)
C                                    !      low limit channel number
C   INTEGER*2 C_HIL(MAX_NO_COND,MAX_NO_ARRAYS)
C                                    !      high limit channel number
C
C   BYTE DAYTIME     (24,MAX_NO_ARRAYS) !   time of data generation
C   BYTE COMMENT     (LCOMM) !      comment found in block with id 'TX'
C   INTEGER*4 IFLAG          !      file read return status
C                            ! -3   wrong input parameter list
C                            ! -2   internal file structure error
C                            ! -1   end of file during read
C                            !  0   no error
C                            !  1   at least one arry truncated
CC
CC Common Block for the free style I/O routines
C   COMMON /INOUT/ NIN, NOUT, BATCHI, NBATCHI, BATCHO, NBATCHO
C   INTEGER*4 NIN, NOUT, NBATCHI, NBATCHO
C   LOGICAL*1 BATCHI, BATCHO
CC
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
CC ******************************************************************
```

BKLIB

BKUTY

BK_W_SIN

```
CC
CC  FILE: BKWSIN.FOR        Write singles spectra (arrays) in
CC  ================        Big Karl data format (ACQUIRE)
CC                          B.BRINKMOELLER  1-MAR-1985
CC 17-DEC-1985 B.brinkmoeller :
CC changed to support new (I*2, Real*4) data types
CC
C   SUBROUTINE BK_W_SIN (LUN, FILENAME,
C     *                       MAX_NO_ARRAYS, MAX_LEN_ARRAYS, MAX_NO_COND,
C     *                       NO_OF_ARRAYS, ARRAY_NUMBER, ARRAY,
C     *                       TYPE, PARAM, SIZE, GAIN, OFFSET,
C     *                       PARAM2, SIZE2, GAIN2, OFFSET2,
C     *                       CONDITIONS, C_PAR, C_LOL, C_HIL,
C     *                       LCOMM, COMMENT, IFLAG)
CC
CC The output of this routin is a file in standart BIG KARL format with
CC 1) a biginning block. (ID = 'BG')
CC 2) an optional block for the comment. (ID = 'TX')
CC 3) for each array one describtion block containing information passed
CC    in  PARAM, SIZE, GAIN, OFFSET, PARAM2, SIZE2, GAIN2, OFFSET2, CONDITIONS,
CC    C_PAR, C_LOL, and C_HIL, and data blocks for the ARRAY. (ID = TYPE)
CC 4) an end block. (ID= 'BG')
CC
CC !!! The validity of the data typ is not checked. Make sure to pass the
CC     correct TYPE for the array. supported are :
CC     TYPE = 'RE' for 1-dim REAL*4 arrays
```

```
CC          = 'LZ' for 1-dim INTEGER*4 arrays
CC          = 'PL' for 1-dim INTEGER*2 arrays
CC          = '2R' for 2-dim REAL*4 arrays
CC          = '2L' for 2-dim INTEGER*4 arrays
CC          = '2D' for 2-dim INTEGER*2 arrays
CC          = '28' for 2-dim 8 Bit arrays
CC          = '24' for 2-dim 4 Bit arrays
CC          = '22' for 2-dim 2 Bit arrays
CC          = '21' for 2-dim 1 Bit arrays
CC
CC Input arguments:
C   INTEGER*2 LUN            !       Fortran logical unit number
C   CHARACTER*(*) FILENAME   !       name of file to write
C   INTEGER*2 MAX_NO_ARRAYS  !       maximum number of arrays
C   INTEGER*4 MAX_LEN_ARRAYS!        maximum length of arrays
C                            !       meassured in long words
C   INTEGER*2 MAX_NO_COND    !       maximum number of conditions
C
C   INTEGER*2 NO_OF_ARRAYS   !       number of arrays to write
C   ! NO_OF_ARRAYS is not necessarily identical to MAX_NO_ARRAYS.
C   ! So there is a possibility to scip arrays in the input list by setting
C   ! ARRAY_NUMBER of the array to zero.
C
C   INTEGER*2 ARRAY_NUMBER(MAX_NO_ARRAYS)
C                            !       array numbers to write
C   INTEGER*4 ARRAY(MAX_LEN_ARRAYS,MAX_NO_ARRAYS)
C                            !       array channel content
C
C   INTEGER*2 TYPE  (MAX_NO_ARRAYS) ! array identifier
C
C   INTEGER*2 PARAM  (MAX_NO_ARRAYS) !      parameter number (ADC)
C   INTEGER*2 SIZE   (MAX_NO_ARRAYS) !      array size (channels)
C   INTEGER*2 GAIN   (MAX_NO_ARRAYS) !      ADC gain
C   INTEGER*2 OFFSET (MAX_NO_ARRAYS) !      channel offset (origin)
C
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
C   INTEGER*2 PARAM2 (MAX_NO_ARRAYS) !      parameter number (ADC)
C   INTEGER*2 SIZE2  (MAX_NO_ARRAYS) !      array size (channels)
C   INTEGER*2 GAIN2  (MAX_NO_ARRAYS) !      ADC gain
C   INTEGER*2 OFFSET2(MAX_NO_ARRAYS) !      channel offset (origin)
C                                    !      only used for 2-dim arrays
C
C   INTEGER*2 CONDITIONS(MAX_NO_ARRAYS) !   number of conditions (gates)
C   INTEGER*2 C_PAR(MAX_NO_COND,MAX_NO_ARRAYS)
C                                        !   condition parameter (up to 16)
C   INTEGER*2 C_LOL(MAX_NO_COND,MAX_NO_ARRAYS)
C                                        !   low limit channel number
C   INTEGER*2 C_HIL(MAX_NO_COND,MAX_NO_ARRAYS)
C                                        !   high limit channel number
C
C   INTEGER*2 LCOMM          !       length of comment in byte
C   BYTE COMMENT(LCOMM)      !       comment
CC
CC return argument
C   INTEGER*4 IFLAG          !       file write return status
C                            ! -2    error in input list
C                            ! -1    error code during write
C                            !  0    no error
CC
CC Common Block for the free style I/O routines
C   COMMON /INOUT/ NIN, NOUT, BATCHI, NBATCHI, BATCHO, NBATCHO
C   INTEGER*4 NIN, NOUT, NBATCHI, NBATCHO
C   LOGICAL*1 BATCHI, BATCHO
CC
CC ***************************************************************
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKLIB

BKUTY

BK_WAIT

```
C;
C;
C;  FILE: BKWAIT.MAR        Process wait utility
C;  ================        R.Weber 1-FEB-80
C;                          J.Meissburger 25-JAN-83
C;
C;  FORTRAN SUBROUTINE CALL:
C;
C;  CALL BK_WAIT (absolute_time)
C;  ****************************
C;
C; where:   absolute_time = character string specifying
C;                          absolute time
C;                          (see HELP SPECIFY ABSOLUTE)
C;
C; e.g.:             CALL BK_WAIT ('0 00:00:05.00')
C;
C;          to hibernate process for 5 seconds
C;
C; ********************************************************************************
C;
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKLIB

BKUTY

BK_TT_MODE

```
CC
CC
CC  FILE: BKTTMODE.FOR      Set terminal mode (device independent)
CC  ==================      J.Meissburger 7-Jan-1986
CC
CC VERS: 31-JAN-1986
CC
C   SUBROUTINE BK_TT_MODE (MODE, LOG_UNIT, IFLAG)
CC
C   CHARACTER*(*)   MODE
C   INTEGER*4       LOG_UNIT
C   INTEGER*2       IFLAG
CC
CC Input arguments:
CC
CC  MODE      =     character string symbol specifying the desired
CC                  terminal mode (e.g. 'TCS_MODE' or 'DEC_MODE')
CC                  or
CC                  graphics enhancement (e.g. 'G_LINESTYLE_5')
CC
CC  LOG_UNIT  =     logical unit for  configuration write
CC
CC Output arguments:
CC
CC  IFLAG     =      0 for success
CC                  -1 for configuration failure (any reason)
CC
CC Remark:  The mode symbols correspond to the logical file names used
CC          in BK_TT_CONFIG, but not all (special) features are
```

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

```
CC          generally available. The most important symbols are:
CC          'TCS_MODE' to switch a terminal in PLOT10 compatibility mode
CC          'DEC_MODE' to switch to DEC/ANSI mode (EDIT-mode)
CC
CC ************************************************************************
```

BKLIB

BKUTY

BK_DECODE

```
C;
C;
C;
C;  FILE: BKDECODE.MAR      DECODE A SINGLE EVENT INTO ADC'S
C;  ==================      AUTHOR: H.Stoff, ZEL
C;                          J.MEISSBURGER 13-FEB-85 modified
C;
C   .TITLE  BK_DECODE       Decode a single Memphis event
C;
C;
C;  FORTRAN SUBROUTINE CALL:
C;
C;  CALL BK_DECODE (LISTMODE_EVENT,
C;  1               BIT_POSITION_TABLE,
C;  2               BYTE_POSITION_TABLE,
C;  3               WORD_LENGTH_TABLE )
C;
C;
C;
C; n        PARAMETER LIST:         n(AP)  = addr. of argument
C;                                 @n(AP) = argument (immediate)
C;
```

```
C; +
C; O NO. OF ARGUMENTS = 4
C;
C;
C; 4 LISTMODE_EVENT INTEGER*2  ADDRESS OF EVENT BUFFER
C;
C; 8 BYTE_POSITION_TABLE    INTEGER*4  ADDRESS OF BYTE_POSITION_TABLE
C;
C; 12 BIT_POSITION_TABLE    INTEGER*4  ADDRESS OF BIT_POSITION_TABLE
C;
C; 16 WORD_LENGTH_TABLE     LOGICAL*1  ADDRESS OF WORD_LENGTH_TABLE
C;
C;
C; ************************************************************************
C;
```

BKLIB

BKUTY

BK_TT_CONFIG

```
CC
CC
CC  FILE: BKTTCONF.FOR      CONFIGURATION UTILITY
CC  ==================      J.Meissburger 26-Sep-1985
CC
CC Vers: 28-Jan-1986
CC
CC  Subroutine call:
CC
C   SUBROUTINE BK_TT_CONFIG (CONFIGS, LOG_UNIT, IFLAG)
CC
C   CHARACTER*(*)   CONFIGS
```

```
C   INTEGER*4       LOG_UNIT
C   INTEGER*2       IFLAG
CC
CC  The subroutine BK_TT_CONFIG reads the files defined
CC  by "CONFIGS" and copies them to the device defined
CC  opened on logical unit "LOG_UNIT".
CC
CC  Input arguments:
CC
CC  CONFIGS =       one or more logical names or
CC                          file names to be copied,
CC                               e.g. 'ft5$hp_mode,ft5$aids_off'
CC
CC  LOG_UNIT        =       output logical unit
CC                               (Default = 6)
CC
CC  IFLAG           =       error flag 0 = success
CC                                     -1 = failure
CC
CC ****************************************************************
```

BKLIB

BKUTY

BK_TT_AST

```
CC
CC
CC  SUBROUTINE BK_TT_AST (DUMMY)    Terminal Ctrl-Y AST routine
CC  ============================    J.Meissburger 26-Sep-1985
CC
CC Subroutine to handle terminal Ctrl-Y
CC
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
CC Input argument:
CC
CC  DUMMY    =        dummy argument, but must be provided in
CC                    any call to BK_TT_AST
CC
CC Function value returned:
CC
CC  BK_TT_AST        =        0 (FALSE), if no Ctrl-Y was hit
CC                    =        1 (TRUE),  if Ctrl_Y was hit
CC
CC ------------------------------------------------------------
CC
CC  SUBROUTINE BK_TT_AST_ENA
CC
CC enables Ctrl-Y recognition by program, disables recognition by DCL
CC
CC  SUBROUTINE BK_TT_AST_DIS
CC
CC disables Ctrl-Y recognition by program, reenables recognition by DCL
CC
CC Rem: These routines have to be called  only  o n c e  at program
CC      initialization and at program exit resp.
CC
CC ----
CC
CC
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKLIB

BKUTY

BK_GET_PAR

```
CC
CC
CC  FILE: BKGETPAR.FOR      Get input parameters from foreign command
CC  ==================      J.Meissburger 3-Jun-1985
CC
CC VERS: 22-JAN-1986
CC
C   SUBROUTINE BK_GET_PAR (PAR, L_PAR, N_PAR)
CC
CC  The subroutine reads a foreign command parameter list and
CC  returns the number of parameters found, the parameters and
CC  their true string length.
CC
CC  Input arguments:
CC
CC  none, parameter list read from SYS$INPUT
CC
CC  Output arguments:
CC
CC  CHARACTER*64  PAR(8) = parameter values returned
CC        INTEGER*2   L_PAR(8) = length of parameter strings
CC        INTEGER*2   N_PAR    = number of parameters found
CC
CC ***********************************************************
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKLIB

BKUTY

BK_TRNLOG

```
CC
CC  FILE: BKTRNLOG.FOR      translate logical name to physical device name
CC  ==================      J.Meissburger 29-Nov-1985
CC
CC VERS: 5-FEB-1986
CC
C   SUBROUTINE BK_TRNLOG ( LOG_NAME, DEV_NAME, L_DEV_NAME )
CC
C   CHARACTER*(*) LOG_NAME, DEV_NAME
C   INTEGER*2 L_DEV_NAME
CC
CC Input arguments:
CC
CC  CHARACTER*(*) LOG_NAME  =        logical name to translate
CC
CC Output arguments:
CC
CC     CHARACTER*(*) DEV_NAME       =        resulting pysical device name
CC     INTEGER*2     L_DEV_NAME     =        number of characters in DEV_NAME
CC
CC Rem: The subroutine translates until there is no further translation.
CC      Special (invisible) leading characters (<ESC>...) are removed so
CC      that the result can be used for string comparison !
CC
CC ***************************************************************************
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKLIB

BKUTY

BK_TT_TYPE

```
CC
CC  FILE: BKTTTYPE.FOR              Get terminal type symbols
CC  ==================              J.Meissburger 13-Jun-1985
CC
CC Vers: 18-APR-1986 (VERS: VMS 4.3)
CC
C   SUBROUTINE BK_TT_TYPE ( LOG_NAME, TT_TYPE, L_TT_TYPE,
C     *                                    TT_SYS_TYPE, L_SYS_TYPE )
CC
C   CHARACTER*(*)   LOG_NAME, TT_TYPE, TT_SYS_TYPE
C   INTEGER*2       L_TT_TYPE, L_SYS_TYPE
CC
CC  This subroutine returns the device class or the terminal type
CC  for terminal-class devices (secondary characteristics) for
CC  the device specified by the logical or physical device name
CC  LOG_NAME. Default for LOG_NAME is SYS$COMMAND. TT_TYPE and
CC  TT_SYS_TYPE are set to 'UNKNOWN" if the device (class) is not
CC  known to the system.
CC
CC  For a process running in BATCH mode TT_TYPE = 'BATCH'
CC  will be returned.
CC
CC ****************************************************************
CC
CC  Input arguments:
CC
CC    LOG_NAME      =       logical device name (default = 'sys$command')
CC
CC  Output arguments:
```

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

```
CC
CC    TT_TYPE     = device class or terminal type for terminal-class
CC                      e.g. "DISK" or "BATCH" or "FT5"
CC    TT_SYS_TYPE = permanent system terminal type
CC
CC    L_TT_TYPE   = length of terminal type return string
CC
CC    L_SYS_TYPE  = length of permanent type return string
CC
CC ************************************************************
```

BKLIB

BKMAT

```
                        ************************
                        *  Library: B K M A T  *
                        ************************
```

The following modules are available in BKLIB:BKMAT/LIBR
(All subroutines are part of MATRIX, Author: W.Huerlimann)

CHISQR	perform a chisquare fit
CHIPOL	polynomial fit using CHISQR

ALGEBRA matrix operations:

MTXADD
MTXEQU
MTXINV
MTXMAT
MTXMBT
MTXMLT
MTXMSC
MTXSUB

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

MTXTRA

MTXTRP

MTXUNT

MTXWRT

BKLIB

BKMAT

ALGEBRA

```
CC*****************************************************************
CC
CC  F I L E :   ALGEBRA.FOR          MATRIX ALGEBRA SUBROUTINES.
CC  ========================         W. HUERLIMANN 18-OCT-81
CC
CC*****************************************************************
CC
CC  F I L E :   MTXTRA.MAT           COPY MATRICES
CC  ======================           W. HUERLIMANN APR-81
CC
CC  SUBROUTINE MTXTRA(A,R,M,N)
CC
CC  COPY THE (M*N) MATRIX A INTO R.
CC  LIT.: BRANDT "DATENANALYSE".
CC
CC
CC  F I L E :   MTXMSC.MAT           MULTIPLY MATRIX WITH SCALAR
CC  ======================           W. HUERLIMANN  APR-81
CC
CC  SUBROUTINE MTXMSC(A,R,S,M,N)
CC
CC  MULTIPLY THE (M*N) MATRIX A WITH SCALAR S AND STORE RESULT IN R.
```

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

```
CC  LIT.: BRANDT "DATENANALYSE".
CC
CC
CC  F I L E :   MTXUNT.MAT          GENERATE UNIT MATRIX
CC  ======================          W. HUERLIMANN  APR-81
CC
CC  SUBROUTINE MTXUNT(R,N)
CC
CC  GENERATE THE (N*N) UNIT MATRIX R.
CC  LIT.: BRANDT "DATENANALYSE".
CC
CC
CC  F I L E :   MTXTRP.MAT          TRANSPOSE MATRIX
CC  ======================          W. HUERLIMANN  APR-81
CC
CC  SUBROUTINE MTXTRP(A,R,M,N)
CC
CC  TRANSPOSE THE (M*N) MATRIX A AND STORE RESULT IN R.
CC  LIT.: BRANDT "DATENANALYSE".
CC
CC
CC  F I L E :   MTXADD.MAT          ADD MATRICES
CC  ======================          W. HUERLIMANN  APR-81
CC
CC  SUBROUTINE MTXADD(A,B,R,M,N)
CC
CC  ADD THE TWO (M*N) MATRICES A,B AND STORE RESULT IN R.
CC  LIT.: BRANDT "DATENANALYSE"
CC
CC
CC  F I L E :   MTXSUB.MAT          SUBTRACT MATRICES
CC  ======================          W. HUERLIMANN  APR-81
CC
CC  SUBROUTINE MTXSUB(A,B,R,M,N)
CC
```

```
CC  SUBTRACT THE (M*N) MATRIX B FROM THE MATRIX A AND STORE RESULT IN R.
CC  LIT.: BRANDT "DATENANALYSE".
CC
CC
CC  F I L E :   MTXMLT.MAT          MULTIPLY MATRICES
CC  ======================          W. HUERLIMANN  APR-81
CC
CC  SUBROUTINE MTXMLT(A,B,R,M,L,N)
CC
CC  MULTIPLY THE (M*L) MATRIX A WITH THE (L*N) MATRIX B
CC  AND STORE RESULT IN (M*N) MATRIX R.
CC  LIT.: BRANDT "DATENANALYSE".
CC
CC
CC  F I L E :   MTXMAT.MAT          MULTIPLY MATRICES
CC  ======================          W. HUERLIMANN  APR-81
CC
CC  SUBROUTINE MTXMAT(A,B,R,M,L,N)
CC
CC  MULTIPLY THE TRANSPOSE OF THE (L*M) MATRIX A WITH THE (L*N) MATRIX B
CC  AND STORE RESULT IN (M*N) MATRIX R.
CC  LIT.: BRANDT "DATENANALYSE".
CC
CC
CC  F I L E :   MTXMBT.MAT          MULTIPLY MATRICES
CC  ======================          W. HUERLIMANN  APR-81
CC
CC  SUBROUTINE MTXMBT(A,B,R,M,L,N)
CC
CC  MULTIPLY THE (M*L) MATRIX A WITH THE TRANSPOSE OF THE (N*L) MATRIX B
CC  AND STORE RESULT IN (M*N) MATRIX R.
CC  LIT.: BRANDT "DATENANALYSE".
CC
CC
CC  F I L E :   MTXEQU.MAT          SOLVE LINEAR EQUATION
```

```
CC  ======================          W. HUERLIMANN  APR-81
CC
CC  SUBROUTINE MTXEQU(A,B,N,M,IERR)
CC
CC  SOLVE THE LINEAR EQUATION A*X=B USING GAUSSIAN ALGORITHM.
CC  DIMENSIONS OF MATRICES: A(N*N), X(N*M), B(N*M).
CC  THE MATRIX A WILL BE DESTROYED AND THE SOLUTION FOR X
CC  IS WRITTEN INTO MATRIX B.
CC  LIT.: BRANDT "DATENANALYSE"
CC
CC  ERROR FLAG:  IERR=0 ALL OK
CC               IERR=-1 ERROR
CC
CC
CC  F I L E :   MTXINV.MAT          MATRIX INVERSION
CC  ======================          W. HUERLIMANN  APR-81
CC
CC  SUBROUTINE MTXINV(A,R,N,IERR)
CC
CC  INVERT THE (N*N) MATRIX A AND STORE RESULT IN R.
CC  THE INPUT MATRIX A WILL BE DESTROYED.
CC  LIT.: BRANDT "DATENANALYSE".
CC
CC  ERROR FLAG:  IERR=0 ALL OK
CC               IERR=-1 ERROR IN SUBROUTINE MTXEQU
CC
CC
CC  F I L E :   MTXWRT.MAT          PRINT MATRIX
CC  ======================          W. HUERLIMANN  JUN-82
CC
CC  SUBROUTINE MTXWRT(A,M,N)
CC
CC  PRINT THE (M*N) MATRIX A ON LOGICAL UNIT NOUT.
CC  LIT.: BRANDT "DATENANALYSE".
CC
```

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

```
CC ******************************************************************

BKLIB

  BKMAT

    CHISQUARE

      CC**************************************************************************
      CC
      CC  F I L E :   CHISQUARE.FOR       LEAST SQUARE FIT SUBROUTINES.
      CC  ========================        W. HUERLIMANN  18-OCT-81
      CC
      CC**************************************************************************
      CC
      CC
      CC  F I L E :   CHIPOL.FIT          POLYNOMIAL FIT USING SUBROUTINE CHISQR.
      CC  ======================          W. HUERLIMANN 25-JUL-81
      CC
      CC  SUBROUTINE CHIPOL(X,Y,SIGMA,NPNTS,COEFF,ERR,NDEG1,IPR,IERR)
      CC
      CC      X = ARRAY (LENGTH=NPNTS) CONTAINING X-VALUES
      CC      Y = ARRAY (LENGTH=NPNTS) CONTAINING Y-VALUES
      CC  SIGMA = ARRAY (LENGTH=NPNTS) CONTAINING ERRORS
      CC  COEFF = ARRAY (LENGTH=NDEG1) OF POLYNOMIAL COEFFICIENTS
      CC    ERR = ARRAY (LENGTH=NDEG1) OF COEFFICIENT ERRORS
      CC  NDEG1 = DEGREE OF POLYNOMIAL + 1
      CC    IPR = PRINTOUT CONTROL :  <0  ONLY ERROR MESSAGES ON LUN NOUT
      CC                              =0  SHORT OUTPUT ON LUN NOUT
      CC                              >0  LONG  OUTPUT ON LUN NOUT
      CC
      CC  ERROR FLAG:  IERR=0 ALL OK
      CC               IERR=1 ERROR
      CC
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
CC
CC  F I L E :   CHISQR.FIT          GENERAL LEAST SQAURE FIT
CC  ======================          W. HUERLIMANN  25-JUL-81
CC
CC  LIT.: BRANDT "DATENANALYSE"
CC
CC  ERROR FLAG:  IERR=0 ALL OK
CC               IERR=1 ERROR
CC
CC  SUBROUTINE CHISQR(T,Y,CY,N,M,NR,X,CX,ETA,CETA,IPR,IERR)
CC
CC  IMPLICIT REAL*8 (A-H,O-Z)
CC  DIMENSION T(1),Y(1),CY(1),X(1),CX(1),ETA(1),CETA(1),
CC    *            A(2500),B(2500),C(50),XI(50),DELTA(50),EPSLN(50),
CC    *               GB(2500),S1(2500),S2(2500),S3(2500),S4(2500),S5(2500)
CC  COMMON /INOUT/ NIN,NOUT
CC
CC  THE MEASURED VALUES ARE STORED IN Y, THEIR COVARIANCE MATRIX IN CY
CC  AND THE NUMBER OF MEASUREMENTS IN N.
CC
CC  IPR<0 :  PRINT ONLY ERROR MESSAGESON LUN NOUT.
CC  IPR=0 :  SHORT PRINTOUT ON LUN NOUT.
CC  IPR>0 :  LONG PRINTOUT ON LUN NOUT.
CC
CC ***************************************************************
CC
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKLIB

AGII

Tektronix Advanced Graphing II
For module description see Tektronix part 4010A02
PLOT10 Advanced Graphing II user manual (Big Karl room 47)
The library BKLIB:AGII.OLB is created with FORTRAN option /I4/NOF77

BKLIB

GMA10

Extended PLOT1 library, but created with FORTRAN option /NOI4 to match 16 bit DMA access. This library is to be used for access to either the GMA102A direct memory access display (Software extension by H.Stoff, ZEL) or to a standard TCS compatible graphics terminal with automatic terminal configuration and special enhancements (Software extension by J.Meissburger using BK_TT... routines)

For more details see: $ BKHelp Graphics...

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKLIB

GMAGII

same as AGII, but created with FORTRAN option /NOI4 to match the related GMA10 library.

BKLIB

PLOT10

For module description see Tektronix document No. 062-1474-00
PLOT-10 Terminal Control System users's manual (Big Karl room 47)
The library BKLIB:PL010.OLB is created with FORTRAN option /I4

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP BRHO (14 July 1986):

BRHO

****

*** BRHO ***

****

Author: B.Brinkmoeller

BRHO is Big Karls kinematic program providing the following options:

PLOT (on graphics line printer or calcomp ploter)

- THE BRHO - VALUE of a particle after a reaction
- THE ENERGY of a particle after a reaction
- THE ENERGY LOSS of a particle in the target

as a function of

- THE ENERGY OF THE INCOMING PARTICLE
- THE ANGLE OF MEASURMENT (LAB. ANGLE)

CALCULATE calculate all relevant kinematic data for a reaction as defined by an INPUT or SAVE/READ dataset.
The results are stored in a file which may be
Printed, Typed on your terminal or
used as an input data file for BKARL0

BRHO

INPUT

With the INPUT command you start entering reaction data.
The program prompts for the data needed to create a dataset.
For further use the data may be written to a file BRAxxxx.INP

with the SAVE command.

BRHO

READ

With the READ command you can read data from a previously saved file.
Files with a structure compatible for read are BRAxxxx.INP.
The program prompts you for the file name.

BRHO

SAVE

With the SAVE command you can write the stored dataset to a file BRAxxx.INP
This dataset can than be restored anytime with the READ command

BRHO

STATUS

Short Information on stored data
For more Information use the LIST command

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BRHO

LIST

With the LIST command you can examine the stored data.
If no further specification is given a summary is displayed.
To take a closer look some special options are provided.

BRHO

LIST

AL

List all data stored.

BRHO

LIST

RE

List the data of the rest nuclei of the reaction and the excitation energies

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BRHO

LIST

TA

List the target data

BRHO

LIST

OU

List the data of the outgoing particle

BRHO

PLIST

Print a list of all data stored on the line printer.
(This command does n o t write the data to a file !)

BRHO

PLOT

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

With the PLOT command you specify the kind of plot you want the program to perform.

The program prompts you for the possible parameters. Some values may be omitted to enable defaulting.

If you want to choose the CALCOMP plotter as the output device you have to use the SUBMIT command after you specified the plot. If you don't, the plot will be routed to the graphics line printer after you EXIT the program

BRHO

PLOT

X-SIZE

Length of the frame surrounding the plot in X - direction. The default value and maximum is 28 cm.

BRHO

PLOT

Y-SIZE

Length of the frame surrounding the plot in Y - direction. The default value is 40 cm.

The maximum value is 120 * X-SIZE / 28 cm

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

(for most applications you may simply assume that the
maximum value is larger than what you need)

BRHO

PLOT

Y-VARIABLE

possible Y-VARIABLES are:

BR	for the BRHO VALUE of a particle after a reaction
E3	for the ENERGY of a particle after a reaction
EL	for the ENERGY LOSS in the target

BRHO

PLOT

Y-LIMITS

You may give minimum and maximum Y - Values to be plotted.
If you do not enter both, the program will set default values
so that all output variables belonging to main targets are
within the frame of the plot.

BRHO

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

PLOT

X-VARIABLE

possible X- VARIABLES are:

TH	FOR THE ANGLE OF MEASUREMENT
EN	FOR THE BEAM ENERGY

You have to give minimum and maximum X - Values.

BRHO

PLOT

PARAMETER

When you plot as a function of the beam energy
you have to give a fixed value for the lab - angle
When you plot as a function of lab - angle
you have to give a fixed value for the beam energy

BRHO

SUBMIT

With the SUBMIT command you start a seperate process BRAxxxx in the batch - queue that executes all tasks you have specified before with the PLOT command.
The program prompts you for an output device.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

You may choose between line printer and CALCOMP plotter.
The line printer is the default output device.

If you choose the CALCOMP plotter make sure that it is set correctly b e f o r e you submit the job. The job will hang up otherwise.

You may submit as many jobs as you want in one run of the program and each job can execute any number of plots.

BRHO

EXIT

Return to DCL - level.
If some plots are not submitted by the SUBMIT command, they will be executed n o w by a job BRAxxxx that is submitted to the batch - queue. The output device is the line printer.

BRHO

EXAMPLE

Typical procedure using Program BRHO

```
BR> IN          ! Start input of reaction data
.               ! The program prompts for the data
.
.
BR> SAVE        ! Optionally save the data to a file BRAxxxx.INP
```

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

```
BR> PLOT          ! Enter the  characteristics of the plot you want
.                 ! to create. The program prompts you for the options
.                 ! available
.
BR> SUB CAL       ! The data you entered are passed to a batch job
                  ! which does the calculation. The output device
                  ! will be the CALCOMP plotter.
BR> CAL           ! Calculate all reaction kinematics for the stored
.                 ! dataset and write the results to a file BRAxxxx.DAT
.                 ! You may PRINT or TYPE this file to have some numbers
.                 ! to take home. (and to be happy!)
BR> EXIT          ! Exit the program
```

For more information about the individual commands use the HELP command

BRHO

CALCULATE

With the CALCULATE command you write the results of kinematic calculations for the stored data to a file BRAxxxx.DAT. All calculations are performed by a job BRAxxxx which is automatically submitted by the program. You may choose whether you want the output file to be printed at once

BRHO

ABORT

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

If you abort the jobs that were submitted to the batch - queue there will be files BRAxxxx.COM and BRAxxxx.TMP left on your directory. They are used for communication between BRHO and the programs that are doing the calculation. On normal execution these files are deleted automaticaly if they are no longer needed.

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP CERN (14 July 1986):

CERN

To access the CERN library or utility programs just include the command

$ CERN

in your LOGIN file.

CERN

CERNLIB

The CERNLIB object library is included by specifying

$ LINK ...., CERNLIB/LIBR, ...

in the program link step. It is the concatenated CERN library and resides on CERN$COM directory.

CERN

PATCHY

The PATCHY utility is automatically made available when issuing the $ CERN command. For more details see: $ BKHelp PATCHY

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP CTR (14 July 1986):

CTR

```
************************
*  C O S Y T R I E V E  *
************************
```

Author: J.Meissburger

CTR (= poor man's DTR) serves as information storage and retrieval system. The keywords are user-definable with defaults for use as a literature index system.

CTR uses simple, single character commands and prompts for parameters where required. In order to work properly you must at least have read access to the database and its directory. Temporary files are generated on your private directory and deleted after closing the session.

The basic operation with CTR is to establish a collection of records using a joint keyword search (option "C"ollect).
Example:

```
Collect   Accelerator,resonance    and
```

collects all occurences of string "Accelerator" AND "resonance" in the same record (database entry). The temporary collection may then be typed ("T") or printed ("P") or temporarely saved ("S") for further processing.

>>> Warning: N e v e r try to even read a database file *.DBS using an Editor such as EDT - it will permanently damage your database ! (Special commands are available to encode/decode to CTR/EDT format)

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

CTR

Database

The file name of a database with extension .DBS preceded by device and directory information where appropriate. (The database has a special and fixed format generated by CTR). If you specify the name of a database that does not exist, the system will create a new database with this name. New records are added by using the Insert option ("I").

Example: Database: CERN$INF:CERNLIB

If you frequently access a given database you may define a corresponding symbol in your private LOGIN file such as:

```
$ LIT*erature :== 'CTR  usersys:ctrconfig.dfl database_name
```

The database is always sorted according to the first ten characters of the first record field. If the first field contains first and family names the sorting automatically acts on the family name. (If you want special sorting criteria you may do so by including a dummy family name at the beginning). First names are characterized by not more than 2 characters followed by a full stop. Family names are 3 or more characters long.

CTR

Configuration

The actual keyword fields are defined in a configuration

data file. Default is USERSYS:CTRCONFIG.DFL which configures CTR for literature index storage and retrieval. The name of a user-defined configuration file may be given as first parameter when invoking CTR. Example:

MYCTR:=='CTR my_config.dat my_database.dbs

CTR

HELP

Type or print this HELP information (see. BKHelp BKHELP)

CTR

COLLECT

Format:

Collect keyword[,...]] [matching operator]

This command searches trough the database for the occurence of the given keyword(s). If several keywords are specified it searches for a logical match of the keywords using the matching operator. Possible operators are AND (Default), OR, NAND and NOR.

If at least one match could be found it temporarely stores the selected records as a COLLECTION which eventually may be typed or printed.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

CTR

TYPE

Type [save_collection[,...]]

Type the actual temporary or saved collections or the entire database if no collection is present. Typing may be interrupted by <CTRL-Y>.

CTR

PRINT

Print [save_collection[,...]]

Print the actual temporary or saved collections or the entire database if no collection is present.
Printing is routed to the desired print device. To abort printing type: $ STOP/ABO print_device

Print devices are the usual print queues with automatic printer configuration for high quality printouts.

The command may also be used to save permanent backups of collections to a non-printing device (e.g. if you specify MTA1: for print_device)

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

CTR

INSERT

Insert new records into the database and sort according to first keyword (family name). First names of max. two characters are separated by full stops. Family names must be at least three characters long (pad with blanks if necessary).

All other fields are optional but should be provided whenever possible. (If you omit one of the fields it is recommended to insert a unique character combination which is easly recognized for later replacement !)

Input of single records may be cancelled by typing <Ctrl-Y>, input is terminated by <Ctrl-Z>.

Example: Option (...): Insert

```
AUTHORS  : X.Y.Ch.Mueller, X.Meier,
AUTHORS  : A. Li
AUTHORS  : <RET>
TITLE    : Any title
TITLE    : <RET>
REFERENCE: JUEL-Spez xxxx
REFERENCE: <RET>
YEAR     : ??Y??
YEAR     : <RET>
KEYWORDS : Accelerator, cooling
KEYWORDS : <RET>
```

At the end of an Insert session the old database may be replaced by the updated one containing the new records. A purge/keep=2 operation will be performed saving the new and the previous versions. (Purging requires appropriate access rights to the older database versions)

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

CTR

STATUS (?)

Displays status information on temporary and saved collections

CTR

MERGE

Format:

MERGE collection[,...]] keyword[,...]] [match]

The Merge command allows to create a new temporary collection out of one ore more previously saved collections. (Use "?" to display your collection status). The collections are referenced by their collection numbers, default match is AND. Example:

Merge 1,3,4 accelerator,resonance and

CTR

DELETE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

This command allows to delete a collection of records from the database. It first collects the desired records, displays them on the screen and asks for the creation of a new database with the selected records removed. Finally it allows to replace the actual database by the new one and performs a purge/keep=2 saving the new and the previous versions. (Purging requires appropriate access rights to the older database versions)

CTR

*DECODE

Decode CTR format (*.DBS) into EDT format (*.DAT)

CTR

*ENCODE

Encode EDT format (*.DAT) into CTR format (*.DBS)

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP CYCLE (14 July 1986):

CYCLE

****

* C Y C L E *

****

Author: J.Meissburger

BIG KARLs spectrometer control utility.

It runs on Big Karls PDP-11/40 RSX-11M system and is used to control and monitor the spectrometer status. Related MCR commands are:

MCR> STATUS	to display actual status outside CYCLE
MCR> CYSTOP	to stop ongoing CYCLE activities

CYCLE

COMMANDS

F I L E : CYCLE.INF 24-OCT-80

==========

#XXX	=	numerical argument (format free)
"XXX	=	alphanumerical argument (string)
[..]	=	optional (default)

The commands to CYCLE are automatically written to a log-file CYxxxx.BAT which may in turn be used as an input batch files to CYCLE. The files are regularely saved on tape by the @SAVBATCH procedure.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

CYCLE

HELP

HELP List all valid commands

CYCLE

EXIT

EXIT Program exit to monitor (MCR)

CYCLE

COMMENT

COMMENT ["STRING]

Enter the following text as a comment line

CYCLE

IMMEDIATE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

IMMEDIATE "PSNAME #CURRENT

Immediate power supply setting (no cycling,
therefore not recommended for D1 and D2 !)

CYCLE

CYCLE

CYCLE "PSNAME #CURRENT [#SLOPE]

Present parameters for main power supply cycling (trough
maximum) or set HT and QB powersupplies immediately.
Current values are given in percent, cycling is
D I S A B L E D with slope set to zero.
(DEFAULTS: SLOPE = 0.3%/sec for D1,D2 and
0.6%/sec for Q1-Q3)

CYCLE

MOVE

MOVE "PSNAME #CURRENT [#SLOPE]

Same as " CYCLE ", but without saturation loop (may be
used to do minor loops).

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

CYCLE

SCALE

SCALE "DVNAME #PERCENT [#SLOPE]

Scale power supply currents up or down by
a positive or negative value given in percent of the
actual value. (All QB and HT power supplies are set
immediate, the main power supplies have to be moved
using the "GO" command).

Scale prema readings up or down by a value given in
percent of the actual reading.
("DVNAME=ALL SCALES D1,D2,PRE1-3 SIMULTANEOUSLY)

CYCLE

GO

GO Start moving or cycling

CYCLE

MCYCLE

MCYCLE Activate QB manual cycling

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

CYCLE

STATUS

STATUS ["DVNAME]

Print actual device status

CYCLE

BATCH

BATCH ["FILE]

Enter BATCH mode; the following commands will
be read from a BATCH file instead of the terminal.

CYCLE

FINISH

FINISH Leave BATCH mode and route control back to the keyboard

CYCLE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

PREMA

PREMA [#N] [#T]

List NMR and PREMA values N times in
T minutes time intervals

CYCLE

SET

SET ["DVNAME] [#PAR1] [#PAR2] ...

Set a device according to the given parameters.
Where available defaults are taken for omitted
parameters. (Parameters are positional !)

SLX-SLY	position (MRAD), opening angle (MRAD)
HTD1-HTD2	I0, I1, I2, I3 (% per unit distance)
PRE1-PRE3	Prema reading (MV) by setting the corresponding quadrupole Q1-Q3
FU1-FU4	Fumble probe position
MUX	Multiplexer channels for status

CYCLE

RELEASE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

RELEASE Release all digital control units for manual operation

CYCLE

WAIT

WAIT [#TIME] Wait a given time (minutes) before executing the next command string
(DEFAULT: TIME = 0)

CYCLE

SYMBOLS

>LEGAL PSNAMES: Q, D, S, K, QB, HTD
Q1-Q3, D1-D2, S1, K1-K24, QB51, QB52, QB61, QB62
HTD1-HTD2

>LEGAL DEVICES: SL, PRE, NMR, FU, MUX
SL1-SL4, SLX, SLY, PRE1-PRE4, NMR1, FU1-FU4, MUX 1-63
ALL = D1-D2, PRE1-PRE3

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP FUMMEL (14 July 1986):

FUMMEL

****
* F U M M E L *
****
Author: J.Meissburger

Big Karl magnetic field measurement utility. Used to measure absolute fields with NMR and field gradients with either NMR or Hall probes. This program runs on Big Karl's PDP11/40 control computer !

FUMMEL

COMMANDS

Command format conforms to Big Karl standards for free style input. For command descriptions replace:

#XXX	=	NUMERICAL ARGUMENT (FREE FORMAT)
"XXX	=	ALPHANUMERICAL ARGUMENT (STRING)
[..]	=	OPTIONAL (DEFAULT)

The commands to FUMMEL are automatically written to a log file (*.BAT) which together with the data files (*.DAT) are regularely saved on tape by the procedures @SAVBATCH and @SAVDATA.

FUMMEL

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

HELP

HELP LIST ALL VALID COMMANDS

FUMMEL

EXIT

EXIT MOVE FUMBLE PROBES OUT OF THE MAGNET GAP AND
RELEASE FOR MANUAL CONTROL

FUMMEL

COMMENT

COMMENT ["TEXT]

READ THE TEXT ON THIS LINE AS COMMENT STRING

FUMMEL

STATUS

STATUS DISPLAY THE STATUS OF AN ACTIVATED FUMBLE PROBE

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

FUMMEL

SET

SET "DEV [#XSTART] [#XEND]

SET NEW START/END POSITION AND PREPARE FOR
NEXT MEASUREMENT (ACTIVATE FUMBLE PROBE) OR
RESET DEFAULT VALUES WITH "DEV = DEFAULT

FUMMEL

PREMA

PREMA [#N] ["TIME]

PRINT NMR AND PREMA READINGS N TIMES
IN T MINUTES TIME INTERVALS

FUMMEL

GO

GO START NEXT MEASUREMENT

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

FUMMEL

RELEASE

RELEASE RELEASE DIGITAL CONTROL FOR MANUAL MODE

FUMMEL

BATCH

BATCH "FILE SWITCH FROM TERMINAL INPUT TO BATCH MODE

FUMMEL

FINISH

FINISH END BATCH MODE AND SWITCH BACK TO TERMINAL

FUMMEL

HARDWARE_DEVICES

Important: The FUMMEL utility is an interrupt-driven software working with the four PREMA digital voltmeters PRE1 .. PRE4. Even if the digital voltmeter readings are not used the software

still needs the interrupts in order to perform properly.

>LEGAL DEVICES: FU1, FU2 - MAGNET D1 (DOWNSTREAM)
FU3, FU4 - MAGNET D2 (DOWNSTREAM)

>NOTE: IF ANYTHING SEEMS TO GO WRONG, WAIT AT LEAST
70 SECONDS BEFORE YOU GET NERVEOUS !
(FUMMEL will provide an appropriate timeout
if any of the devices does not respond as
expected !)

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP FUPLOT (14 July 1986):

FUPLOT

```
***************
* F U P L O T *
***************
```

Author: J.Meissburger

The utility FUPLOT on Big Karl's PDP11/40 control computer is used to graphically present the measurements made with FUMMEL. Command input conforms to Big Karl standards:

```
F I L E :   FUPLOT.INF          29-JUL-81
=========================================

#XXX    =       NUMERICAL ARGUMENT (FREE FORMAT)
"XXX    =       ALPHANUMERICAL ARGUMENT (STRING)
[..]    =       OPTIONAL (DEFAULT)
```

FUPLOT

HELP

HELP LIST ALL VALID COMMANDS

FUPLOT

EXIT

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

EXIT PROGRAM EXIT BACK TO THE MONITOR (MCR)

FUPLOT

OPEN

OPEN ["FILENAME, ?]

OPEN A NEW DATA FILE ("FILENAME=DV:[XXX,XXX]FILE.EXT)
OR LIST THE NAME OF AN OPEN FILE (?)
THE LAST MEASUREMENT FILE PRODUCED BY "FUMMEL" IS AUTO-
MATICALLY OPEN ON PROGRAM ENTRY !

FUPLOT

LAST

LAST OPEN THE LAST DATA FILE PRODUCED BY "FUMMEL"

FUPLOT

CLOSE

CLOSE CLOSE A DATA FILE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

FUPLOT

SET

SET [#NVARX] [#NVARY]

SET THE VARIABLE POSITIONS FOR X AND Y IN THE DATA FILE
(DEFAULT: #NVARX=2 FOR POSITION, #NVARY=5 FOR NMR)

FUPLOT

REWIND

REWIND REWIND MAGTAPE

FUPLOT

READ

READ [#N]

READ THE NEXT MEASUREMENT OR MEASUREMENT NUMBER #N
FROM THE DATA INPUT FILE (DEFAULT: NEXT MEASUREMENT)

FUPLOT

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

PLOT

PLOT PLOT THE LAST MEASUREMENT BROUGHT INTO THE BUFFER
WITH A READ COMMAND

FUPLOT

FIT

FIT [#XLOW] [#XHIGH] [#XO]

PERFORM A MULTIPOLE ANALYSYS OF THE LAST MEASUREMENT
IN THE BUFFER. DEFAULT POSITIONS MAY BE OVERWRITTEN
BY SPECIFYING #XLOW, #XHIGH AND #XO. (DEFAULTS ARE
SET ACCORDING TO THE FUMBLE PROBE NUMBER)

FUPLOT

SAVE

SAVE SAVE DATA AND FIT RESULT ON FILE FUSAVE.TMP (FORMATTED)

FUPLOT

ALL

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

ALL IDENTIAL TO "READ FIT PLOT"

FUPLOT

LIST

LIST LIST THE LAST MEASUREMENT IN THE BUFFER.

FUPLOT

CURSOR

CURSOR ["ON, "OFF]

SWITCH THE GRAPHICS CURSOR ON OR OFF

FUPLOT

RES

RES HARD RESET OF TERMINAL (HP-TERMINALS ONLY)

FUPLOT

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

VARIABLES

>NOTE: THE VARIABLES ARE: 1 - TIME IN SECONDS

2 - X-POSITION IN MM

3 - PREMA READING

4 - D(PREMA)/DX

5 - NMR READING

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP GRAPHICS (14 July 1986):

GRAPHICS

The standard graphics libraries are GMAGII and GMA10, the extended derivatives of Tektronix AGII and PLOT10 libraries. The full subset of AGII and PLOT10 calls is contained in these libraries but important features are added:

1) The GMA10 library supports a high speed, high resolution TEK GMA102A DMA display (H.Stoff, ZEL).

2) Features such as automatic (e.g. device-independent) terminal configuration, split-screen capability and display file generation capability are added (J.Meissburger). For more details see:

$ BKHelp Graphics GMA10...

GRAPHICS

AGII

Tektronix Advanced Graphing II
For module description see Tektronix part 4010A02
PLOT10 Advanced Graphing II user manual (Big Karl room 47)
The library BKLIB:AGII.OLB is created with FORTRAN option /I4/NOF77

GRAPHICS

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

GMA10

same as PLOT10, but created with FORTRAN option /NOI4 to match 16 bit DMA access. This library is to be used for access to either the GMA102A direct memory access display (Software extension by H.Stoff, ZEL) or to a standard TCS compatible graphics terminal. Software extensions provide control of special GMA102A features and terminal initialisation for Big Karl standard terminals as well as special enhancements for graphics terminals such as the HP2623A orr the TEK41xx family colour graphics terminals. (Software extension by J.Meissburger using BK_TT... routines)

GRAPHICS

GMA10

Enhancements

Graphics enhancements such as colour are available on the Tektronix 41xx family terminals. The SAMPLE_PROGRAM shows the use of GMA10 (PLOT10) calls together with the BK_TT_MODE enhancement calls.

```
CC
CC  FILE: TTGMA.FOR          Test GMA10 library and enhancement calls
CC  ===============          J.Meissburger, 10-Feb-1986
C
C   PROGRAM TTGMA
C
C   COMMON /TCSINOUT/ TCSIN, TCSOUT
C   INTEGER*4 TCSIN, TCSOUT
C
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
CC Initialize GMA10 an  switch terminal to TCS mode
C
C    CALL INITT(0)
C
C    CALL ANMODE
C    CALL HOME
C
CC Select graphics text index 5
C
C    CALL BK_TT_MODE('G_GTINDEX_5',TCSOUT,IFLAG)
C    WRITE(TCSOUT,20000) 1
C20000       FORMAT(' (',I1,')ANMODE: this message by graphics'
C     *  ' alphamode write ')
C    WRITE(TCSOUT,20001)
C20001       FORMAT('    and continued on second line of graphics area')
C
C
CC Select graphics text index 2
C
C    CALL BK_TT_MODE('G_GTINDEX_2',TCSOUT,IFLAG)
C    CALL MOVABS(100,100)
C    CALL AOUTST(50,'(1)AOUTST: this graphtext message to graphics area')
C
CC Change graphics line index and style
C
C    CALL BK_TT_MODE ('G_LINEINDEX_3',TCSOUT,IFLAG)
C    CALL BK_TT_MODE ('G_LINESTYLE_3',TCSOUT,IFLAG)
C
CC Draw rectangle
C
C    CALL MOVABS(200,200)
C    CALL DRWREL(100,0)
C    CALL DRWREL(0,100)
C    CALL DRWREL(-100,0)
C    CALL DRWREL(0,-100)
```

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

```
C
CC Switch terminal back to dialog ANSI mode
C
C   CALL FINITT(-1,0)
C
C   TYPE *,'(1)FINITT (-1,0) called - this message by TYPE to dialog area'
C
CC Repeat same game with different colours
C
C   CALL RESET
C
C   CALL ANMODE
C   CALL HOME
C
C   CALL BK_TT_MODE ('G_GTINDEX_6',TCSOUT,IFLAG)
C   WRITE(TCSOUT,'(/)')
C   WRITE(TCSOUT,'(/)')
C   WRITE(TCSOUT,20000) 2
C   WRITE(TCSOUT,20001)
C
C   CALL BK_TT_MODE ('G_LINEINDEX_7',TCSOUT,IFLAG)
C   CALL BK_TT_MODE ('G_LINESTYLE_7',TCSOUT,IFLAG)
C   CALL MOVABS(400,400)
C   CALL DRWREL(100,0)
C   CALL DRWREL(0,100)
C   CALL DRWREL(-100,0)
C   CALL DRWREL(0,-100)
C
C   CALL FINITT(0,0)
CC
C   TYPE *,'FINITT (0,0) called - this message should not show up at all C'
C   STOP
C
C   END
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

GRAPHICS

GMA10

Sample_procedures

Typical procedures to execute an image using GMA10 would be:

1) Procedure to execute a graphics application on either SYS$COMMAND or an allocated split graphics terminal:

```
$ ! ....
$ ask_again:
$ inquire/nopunct device "Graphics device (<RET> = TT): "
$ if device.eqs."" then device = f$logical("TT")
$ assign/user_mode 'device tcs_output
$ assign/user_mode 'device tcs_input
$ run/nodebug {application program}
```

2) Procedure modification to force terminal device output:

```
$ if device.eqs."" then .......
$ if f$locate(device,":").eq.f$length(device) then goto ask_again
```

3) Procedure modification to create type-specific/nonspecific display file output:

```
$ ......
$ if device.eqs. .....
$ if f$locate(device,":").eq.f$length(device) then -
  inquire/nopunct tcs_out_type -
 "Terminal type override (<RET> = none): "
$ tcs_in_type = tcs_out_type
```

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

$ .....

GRAPHICS

GMA10

INITT

call: CALL INITT(0)

The routine INITT initializes graphics I/O on either the GMA102 display or on any standard V24-terminal. All terminals except the GMA perform graphics I/O on logical units

```
COMMON /TCSINOUT/ TCSIN, TCSOUT
INTEGER*2 TCSIN, TCSOUT
```

which are assigned to logical files TCS_INPUT and TCS_OUTPUT when calling INITT for the first (and only the first) time.

If the logical files are not explicitely reassigned by the user (e.g. $ ASSIGN/USER TTA1: TCS_OUTPUT) they are assigned by the system to "TT" (the users terminal) at login.

If the logical names TCS_INPUT and TCS_OUTPUT translate to a known and supported terminal device the configuration of the terminal for graphics I/O ("TCS_MODE") is transparent and automatic. Supported terminal types (See TT_TYPE) are:

GMA0	GMA102A DMA display
FT2	HP2648A terminal
FT3	TEK4010/12/14 terminal
VT100	VT100 GB (RETROGRAPHICS)

FT4	WESTWARD 1015
FT5	HP2623A with ANSI option
FT6	Tektronix 4105A colour graphics terminal
FT7	Plessey PT-100G high resolution terminal

In order to save graphics screens on data files (display files) including all configuration data the two symbols

TCS_IN_TYPE and
TCS_OUT_TYPE

may be defined before calling INITT to override the true (or unknown) terminal type. See $ BKHelp AGII Example

GRAPHICS

GMA10

FINITT

call: CALL FINITT (ix, iy)

The routine FINITT terminates graphics I/O. It also terminates program execution (Fortran STOP) according to the PLOT10 standard if called with positive argument ix.

For negative ix the cursor is placed to the absolute values of (ix,iy) and the terminal is automatically reset to dialogue-mode (Edit mode or "DEC_MODE"). The internal graphics status is n o t altered so that additional graphics I/O may continue by calling

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
        CALL INITT (0)  with a graphics page erase
or      CALL RESET      without a graphics page erase
```

GRAPHICS

GMA10

REFRSH

```
REFRSH ( switch, count, x-cursor, y-cursor )
                        - control GMA-Refresh-Mode

        switch          INTEGER*2
                        = 0     stop refresh mode
                        = 1     enable refresh mode to fill
                                refresh buffer
                        = 2     send refresh buffer to GMA-driver
                                and start display refresh
                        = 3     pick up last cursor coordinates
                                of GMA while refresh is active

        count           INTEGER*2       read only
                        current length of used refresh buffer.
                        ( return after switch = 2 )

        x-cursor        INTEGER*2       read only
        y-cursor        INTEGER*2       read only
                        cursor coordinates after last "QIO"
                        ( return after switch =3, atherwise unchanged )
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

GRAPHICS

GMA10

GMA85

GMA85 (nchar, buffer)

- send a character string to the microprocessor of the GMA-Interface. all TEKTRONIX control codes must be send to the mikroprocessor. all ASCII-Characters which are not used in a TEK4014-Terminal will be transmitted to the GMA alphanumeric-terminal.

nchar — INTEGER*2
number of characters to transfer
(max. 100 characters)

buffer — INTEGER*2
buffer address of a FORTRAN array

GRAPHICS

GMAGII

same as AGII, but created with FORTRAN option /NOI4 to match the related GMA10 library.

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

GRAPHICS

PLOT10

For module description see Tektronix document No. 062-1474-00
PLOT-10 Terminal Control System users's manual (Big Karl room 47)
The library BKLIB:PL010.0LB is created with FORTRAN option /I4

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP IGM (14 July 1986):

IGM

****
* I G M *
****

Authors: U.Hacker, J.Meissburger

Big Karl Interactive Graphics Monitor
Version: 13-Jun-1986 (BK-VAX)

IGM provides an easy way to produce a graphical representation of one- to three-dimensional data on TEK4010 compatible terminals or CALCOMP compatible hardcopy plotters.
No programming efford is required to display or manipulate graphs on your terminal - IGM has it's own command language which can be run interactively or in batch mode or even called by a program to invoke IGM as subsystem to your application (See BKHELP IGM EXAMPLE).
For information on parameters and parameter formats type BKHELP IGM PARAMETERS. In case of problems contact U.Hacker

IGM

Example

A typical example for an IGM application would be the plotting of Matrix elements calculated with TRANSPORT: The Transport output files are supposed to be TRFILE.*

```
$ IGM
IGM>sys 'directory trfile*'     ! check for input file
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
IGM>Tra on trfile                ! select Transport input
IGM>Tra b2                       ! select b2 plot
IGM>Lineindex 2 gtindex 5 plot   ! select colours
IGM>Line 3 tra b3 plot           ! add b3 in diff. colour
IGM>Hcsize 1 gcopy               ! make small hardcopy
IGM>Exit
```

IGM

LINEINDEX

LINEINDEX index

Switch the colour index for line and frame plotting to the value of "index" (0 .. 7 on TEK4105A terminals)

IGM

GTINDEX

GTINDEX index

Switch the colour index for alphanumeric text on your plot to the value of "index" (0 .. 7 on TEK4105A terminals)

IGM

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

GCOPY

Initiate a graphics screen hardcopy on the TEK4695 colour printer (Size of copy dependent on HCSIZE setting)

IGM

HCSIZE

HCSIZE size

Select large (size=0) or small (size=1) hardcopy format

IGM

SYSTEM

Perform a DCL system command. Examples:

```
IGM>SYStem 'setansi'
IGM>sys 'edt test.bat'
```

IGM

AUTOSCALE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

AUTOSCALE

Automatically scale for the data boundaries

IGM

BATCH

BATCH filename

Switch the input from keybord to batch mode,
i.e. read commands from dataset "filename".
To suppress the terminal echo use the PRINT OFF command.

Back to keybord input at End Of File or when reading
an END command from batch file.
To temporarely switch back to terminal input use
the PAUSE command in your batch file.

i.e BATCH HALLO.DAT
HALLO.DAT contains the commands to be executed

IGM

CHANGE

```
                { new_X_value new_Y_value [ new_E_value ] }
                { X new_value                              }
CHANGE  pos     { Y new_value [ new_E_value ]              }
```

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

{ D }

CHANGE will change data items in the
data buffer of IGM at line pos.
D means delete the line.

i.e. CHANGE 11 23.56 65.43
in line 11 in the databuffer X will be replaced by 23.56
and Y by 65.43

IGM

CLEAR

CLEAR
CLear the terminal screen.

IGM

CONTINUE

CONTINUE
Continue after a PAUSE command in batch mode

IGM

DATA

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

DATA { X ! Y ! XY ! XYE }

Enter input data from the terminal.

To stop input enter the END command.

i.e. DATA XY

1.0 1.0

2.0 4.0

3.0 9.0

4.0 16.0

5.0 25.0

END

these 5 points will be plotted

IGM

END

END

Switch control back from batch mode to the keyboard.

Stop data input in DATA mode

IGM

EXIT

EXIT

Exit IGM and return control back to system.

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

IGM

HARDCOPY

HARDCOPY

Route last picture to the specified hardcopy device

IGM

HPFUNCTION

HPFUNCTION number

Execute a special function for HP-Terminal

number = 3 "next Page"

IGM

IDENT

IDENT graphic input

Mark details in a graph by using the graphics cursor.

Values for graphic input

M : move beam

D : draw between the last to beam positions

T : write text (defined by TEXT I "text") at cursor positon

E : exit ident mode

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

IGM

INIT

INIT

Resets all internal values (dynamic restart)

IGM

INSERT

```
                  { new_X_value  new_Y_value [ new_E_value ] }
INSERT        pos     { X new_X_value                          }
                  { Y new_Y_value [ new_E_value ]              }
```

Insert new data at line pos in the IGM data buffer

i.e. INSERT 354 Y 21.43 3.456
After position 354: Y=21.43 and E=3.456
will be inserted (X=0.0)

IGM

INPUT

INPUT filename positiondescription

Input reads the dataset filename and stores the data

in the data buffer.
Values for "positiondescription"
X for X-column X-value
Y for Y-column Y-value
E for E-column Error (+- error bar)
S for skip an alphabetic field
D to skip numeric data

i.e INPUT ABC.DAT S X S D S Y
reads ABC.DAT like
....
X-WERT 12.33 Y1-WERT 333.4 Y2-WERT 676.8
X-WERT 33.12 Y1-WERT 22.4 Y2-WERT 44.66
X-WERT 43.78 Y1-WERT   1.22 Y2-WERT 3.4
  ....
X(1)=12.33 Y(1)=676.8 X(2)=33.12 Y(2)=44.66 and so on
will be in the data buffer

IGM

LIST

LIST [start-pos [end-pos]]
List data in data buffer from line start-pos to line end-pos

i.e. LIST 30
lists the whole data beginnig with position 30

IGM

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

MAGNIFY

MAGNIFY { graphic input ! [window xmin xmax ymin ymax] }

defines the magnification window in the origin graph.

Values for first graphic input

1 : identifies window 1

2 : identifies window 2

3 : identifies window 3

Second graphic input

C : continue

E : erase old definition only

A : activates old definition

direct input needs the window number and the x and y ranges

i.e. MAGNIFY 1 22 33 1 4

will magnify in window 1 the data in range x 22 - 33, y 1 - 4

IGM

PAUSE

PAUSE

Temporarely back from batch mode to terminal input

IGM

PLOT

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

PLOT

Draws the data with the specific settings and texts.

IGM

POINT

POINT [{ SCREEN ! VIRTUEL }]

To measure the position of points with the cursor in screen or virtual coordinates.
The default is VIRTUEL.

IGM

PRINT

PRINT [{ ON ! OFF }]

Switches the batch mode or input mode echo on or off
The default is ON.

IGM

READ

READ filename

Reads data in IGM internal format from filename

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

This data will be produced by the WRITE command.

IGM

RESTORE

RESTORE filename
Restores the plot menu from filename.
The menu will be written by SAVE.

IGM

SAVE

SAVE filename
Writes the plot menu into filename.
Keeps it for later use.

IGM

SCALE

SCALE [FIXED] xmin xmax ymin ymax
Sets the minimum and maximum for the range of
the axes of a graph.

i.e. SCALE 1 10 -10 10
Only data in the given range will be drawn.

IGM

SHOW

SHOW
Display the plot menu on the terminal.

IGM

SET

SET parameter
Define a value in the plot menu.

For more information type : HELP SET parameter

IGM

SET

AXIS

SET AXIS { X ! Y } { TICS ttype [tnumber] }

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

{ LABEL lfunction }

ttype Tic type format nm (n minor, m major tics)
value range 1 - 6
default 25

tnumber density of tic marks
value range 1 - 5 without 6 - 10 with minor tics
default 8

lfunction type of axis numbering.

1 linear with description
2 logarithmic
3 linear without axis description
4 logaritmic
For every curve therer is an separate axis
-1 linear normal position
-2 lograithmic
-3 linear opposite position
-4 logarithmic

default 1

IGM

SET

DEFAULT

SET DEFAULT
Reset all values in the plot menu to the default values.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

IGM

SET

ERROR

SET ERROR errvalue [ssize]
Sets errors of Y-Values in percent of actual values.
If errvalue eq. 0. data is taken from E-vector of databuffer.
ssize is the scaling factor for the symbol height.

The symbol type "stype" MUST BE NEGATIVE !!!!

IGM

SET

FRAME

SET FRAME [{ Y ! N }]
Y a plot frame will be drawn.
N no plot frame will be drawn.
Deault Y.

IGM

SET

LINE

SET LINE ltype
Defines the line type
Range for ltype 1 - 9 and -1, -4, -11
-1 no line
-4 point plot
-11 Histogram with variable bin width.

IGM

SET

MULTIPLOT

SET MULTIPLOT mcount
With mcount = -1 its possible to draw an arbitrary number
of graphs in one screen.

IGM

SET

SYMBOL

SET SYMBOL stype
Defines the symbol at the exact position of the
data points
Range for stype is 0 - 11
Default is 0 (No symbol).

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

To mark the Error stype must be negative.

IGM

TEXT

TEXT { X1!X2!Y1!Y2!C1!C2!I!D } 2 text2
Defines the 2 text2 for the text arrays X1 - I
D deletes all definition.
Is 2 text2 missing the old value for the specified field
is erased.

TEXT POS { graphic input ! [num xpos ypos] }
Defines the text position on screen.
Graphic input.
X X-text fields
Y Y-text fields
C C-text fields
E exit graphic input.

Direct input
num is 1 for X, 2 for Y, 3 for C,
xpos,ypos are in screen coordinates.

IGM

TRANSPORT

TRANSPORT { ON ! OFF } filename

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

Switches input mode to special for reading TRANSPORT files

TRANSPORT ?

Displays the input file name.

TRANSPORT element

Defines the Matrix element for graph (B1-B6 are the beam)

i.e TRANSPORT R22 and so on.

TRANSPORT ELLIPSE {XT!XP!XD!YT!YP!YD} pos

Defines witch ellipse will be drawn

if pos is negative it will be the position in the data buffer

IGM

WINDOW

WINDOW { graphic input ! [number xmin xmax ymin ymax] }

Defines the window on the screen to display the data.

Graphic input values

First input

blank main window

1 magnify window 1

2 magnify window 2

3 magnify window 3

secound input

C continue input

E deletes old coordinates

Direct input Number 0 for main window and so on,

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

xmin-ymax will be in screen coordinates.

IGM

WRITE

WRITE filename

Writes the data buffer into filename for later use in internal IGM format.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP MATRIX (14 July 1986):

MATRIX

```
*****************
* M A T R I X   *
*****************
```

Author: W.Huerlimann

The Big Karl spectrometer optimization system.

MATRIX calculates the elements of the BIG KARL TRANSPORT matrix using experimental raytracing. These "aberrations" are determined by least square fitting procedures of the measured data.
The influence of the aberrations to the line broadening may be calculated in order to decide which aberration should be minimized with multipole corrections.

The program reads temporary files generated by ACQUIRE containing peak position data as function of SLX,Y slit positions. This data is analyzed by MATRIX in terms of multipoles depending on slit positions and peak positions along the focal plane (energy)

MATRIX

SUMMARY

==========

How to use M A T R I X W. Huerlimann 13-Nov-81

==========

BIB KARL magnet spectrometer operating system HELP LIBRARY.

Author: J.Meissburger

Meaning	Command	System prompts	Commands to change data or parameters
Start	Username:USER		
	Password:none	$	
	MATRIX	$	
	RUN MATRIX	MTX>	
Data set-up	INPUT ipeak	=	
	ACREAD	=	
	CORRECT ipeak	COR>	vname nline value
	CLEAR	MTX>	
	READ filename	MTX>	
	SHIFT	MTX>	
Control outputs	LIST ipeak [ALL]	MTX>	
	PLOT ipeak	MTX>	SET SIZE nsize
	STATUS	MTX>	
Calculate aberrations	FIT ipeak [ALL]	MTX>	SET DEG ndeg
	FIT aberr	MTX>	SET DEG ndeg
Minimize aberrations	MINIMIZE aberr	MIN>	(see HELP MINIMIZE)
Output of results			
- Aberrations:	LIST aberr	MTX>	
	PLOT ipeak	MTX>	SET SIZE nsize
	PLOT aberr	MTX>	SET SIZE nsize
- Broadenings:	BROAD channel [DEF]	MTX>	SET SLX opening
	PLOT BROAD	MTX>	SET SLX opening

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

			SET SIZE nsize
	PLOT BSL	MTX>	SET SLX opening
			SET SIZE nsize
Line printer outputs	PBROAD, PLIST	MTX>	as BROAD, LIST
	PPLOT, PSTATUS	MTX>	as PLOT, STATUS
--> submit to LP	PRINT	MTX>	
Specials			
- Save data	SAVE filename	MTX>	
- Read data	READ filename	MTX>	
- Batch mode	BATCH filename	BAT:	
- Help	HELP command	MTX>	
- Print this file	SHORT	MTX>	
Stop	EXIT	$	

==========

==========

MATRIX

PARAMETERS

Parameters	allowed values	Meaning
aberr	R12,T122,..,T1222222	aberrations up to 6th order
channel	any number	channel number
filename	up to 9 characters (without extension)	name of batch or data files defaults:

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

		MATRIX.DAT for READ or SAVE
		MATRIX.BAT for BATCH
ipeak	1,2,...,8	peak number
ndeg	<7 for measurements	degree of fit polynomial
	<4 for aberrations	
nline	1,2,...,15	data line number
nsize	1,2,3	plot size: small, medium, large
opening	any number >0	half opening of entrance slit
value	any number for BRHO	new value
		POSITION
		THETA
		>0 for SIGMA
		>1 for COUNTS
vname	BRHO	magnetic rigidity (kG*cm)
	THETA	SLX-entrance angle (mrad)
	POSITION	peak position (channel)
	SIGMA	half peak width (channel)
	COUNTS	counts in peak

==========

MATRIX

COMMANDS

MATRIX command structure is consistent with Big Karl free style input rules. There are three distinct command levels:

MAT>	MATRIX main program level
MIN>	MINIMIZE subprogram level
COR>	CORRECT subprogram level

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

MATRIX

COMMANDS

CORRECT

Call the correction subroutine to change the data of one peak.

Format: CORRECT [ipeak vname nline value]

ipeak = peak number to be corrected: 1,2,...,8
vname = variable to be corrected: BRHO
THETA
POSITION
SIGMA
COUNTS
nline = line number (not used if vname=BRHO)
value = new value

Special commands:

CORRECT ipeak DELETE nline	delete one data line
CORRECT ipeak DELETE ALL	delete the whole peak
CORRECT ipeak	set program into correction mode

In the correction mode with prompting COR> only the commands

vname nline value

or DELETE nline [ALL]

are used. Return to MTX> with carriage return <CR>.

Caution: Before using the CORRECT command you should list the data with the LIST command, because the data points always are ordered to descending values of THETA !

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MATRIX

COMMANDS

EXIT

Program exit back to VAX monitor $.

MATRIX

COMMANDS

FIT

Fit a peak or an angular aberration with a polynomial and calculate the TRANSPORT matrix elements up to the order DEG. The polynomial degree is given by the parameter DEG, which may be changed with the command SET DEG.

Format: FIT [param]

Parameters: ipeak = peak number: 1,2,...,8
Fit one peak and calculate the angular aberrations R12, T122 etc.
ALL Fit all peaks.
aberr = angular aberration: R12,T122,...,T1222222
Fit an angular aberration and calculate the corresponding dispersive aberrations T126, T1266,...,T1226,T12266,..etc.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MATRIX

COMMANDS

HELP

Explain a specified command.

Format: HELP [command]

MATRIX

COMMANDS

INPUT

Data input for a specified peak number (ipeak=1,2,...,8).

Format: INPUT [ipeak]

In the input mode the program asks for input of the following values:

BRHO(ipeak) = magnetic rigidity (kGauss*cm)
(required only for a new peak number)
THETA(n) = SLX-entrance angle (mrad)
POS(n) = peak position (channel)
SIGMA(n) = half peak width (channel)
COUNTS(n) = counts in peak

Each peak number contains one BRHO value and up to n=15 data

points THETA, POS, SIGMA, COUNTS.

Return from input mode to MTX> by typing character E.

MATRIX

COMMANDS

LIST

List data on terminal.

Format: LIST [param]

Parameters: ipeak = peak number: 1,2,...,8
List the data of one peak.
ALL List the data of all peaks.
aberr = angular aberration: R12,T122,...,T1222222.
(if the aberration has been fitted, also the corresponding dispersive aberrations will be listed.)

MATRIX

COMMANDS

PLOT

Plot on terminal. If the data to be plotted has been fitted, the

theoretical curve will be displayed with asterisks (*). The plot size is defined by the parameter SIZE (see command SET SIZE).

Format: PLOT [param]

Parameters: ipeak = peak number: 1,2,...,8
Plot POS vs THETA.
aberr = angular aberration: R12,T122,...,T1222222
Plot aberration vs position.
BRO Plot the theoretical line broadening due to the calculated aberrations as a function of the position in the focal plane. (only fitted aberrations included!)
BSL Plot the theoretical line broadening as a function of of the half slit opening SLX (see command SET SLX).

MATRIX

COMMANDS

READ

Read the peak data from the specified data file. If no file name is given, the default file MATRIX.DAT will be read in. This command clears the already stored data and calculated aberrations.

Format: READ [filename]

Parameter: filename = file name (up to 9 characters)
If not blank, the file

filename.DAT will be read.

MATRIX

COMMANDS

SAVE

Save all stored peak data to the specifies data file. If no file name is given, the default file MATRIX.DAT is used. This command overwrites the old file.

Format: SAVE [filename]

Parameter: filename = file name (up to 9 characters)
If not blank, the data will be saved into the file filename.DAT

MATRIX

COMMANDS

SET

Set a specified parameter to a new value.

Format: SET [param]

Parameters: CONV = conversion factor between channels and cm.

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

DEG = degree of fit polynomial: 0,1,...,6 for meas.,
0,1,2,3 for aberr.

RBND = mean bending radius (cm)

SIZE = size of plots: 1 small plot (60x20 charact),
2 medium plot (90x40 charact),
3 large plot (120x60 charact).

SLX = half slit opening (mrad).

XMID = channel position for central ray
(i.e. middle of detector)

DEF set default values:
DEG=2, SIZE=1, SLX=10 mrad,
CONV=48.8 ch/cm, XMID=1000 ch,
RBND=198.16 cm.

MATRIX

COMMANDS

STATUS

Display the current status of the program. The following informations will be given:

- Values of the parameters DEG,SIZE,SLX,XMID,CONV,RBND (to change parameters use command SET)
- Stored data
- Calculated aberrations
- Calculated values of spectrometer dispersion R16, field value B and magnetic rigidity BRHO corresponding to position XMID.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MATRIX

COMMANDS

BROADENING

Calculate and list the theoretical line broadening due to the calculated aberrations at given positions, using the half slit opening SLX (see command SET SLX). Only fitted aberrations are included in these calculations.

Format: BROAD [param]

Parameters: channel = channel number(s) for which broadening has to be listed.
DEFAULT list broadening for the default channel numbers 0, 200,..., 1800, 2000.

MATRIX

COMMANDS

BATCH

Switch program to batch mode and read all commands from the specified batch file. If no file name is given, the default batch file MATRIX.BAT is used.

Format: BATCH [filename]

Parameter: filename = file name (up to 9 characters)

If not blank, the file
filename.BAT is used.

To return to terminal input, the last command in the batch file must be FINISH.

MATRIX

COMMANDS

FINISH

Last command in batch files used to switch back to terminal input (see command BATCH).

MATRIX

COMMANDS

SHORT

List a short overview of the MATRIX commands on the line printer.

MATRIX

COMMANDS

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

PBROAD

Same as BROAD, but with line printer as output device.

Further explanations: see commands BROAD and PRINT.

MATRIX

COMMANDS

PLIST

Same as LIST, but with line printer as output device.

Further explanations: see commands LIST and PRINT.

MATRIX

COMMANDS

PPLOT

Same as PLOT, but with line printer as output device.

Further explanations: see commands PLOT and PRINT.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MATRIX

COMMANDS

PSTATUS

Same as STATUS, but with line printer as output device.

Further explanations: see commands STATUS and PRINT.

MATRIX

COMMANDS

PRINT

Submit the print output which was generated with the Pcommands (i.e. PBROAD, PLIST, PPLOT, PSTATUS) to the line printer.
This output-file is called MATRIX.OUT and will be erased after printing.

MATRIX

COMMANDS

ACREAD

Read the ACQUIRE file 'ACMTX.TMP'.

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

Format: ACREAD [param]

Parameters:
- ON read file from directory [USER.ACQON]
- OFF read file from directory [USER.ACQOFF]
- BACK read file from directory [USER.ACQBACK]

This file contains the peak integration data items CENT, SIGMA and SUM, which are to be stored into the variables POS, SIGMA and COUNTS. Hereby at most 8 peaks per spectrum are accepted. This new data will be added to already existing data, i.e. 1st data line to peak-nr 1, 2nd data line to peak-nr 2, etc.

If the data of a new spectrum (indicated by a blank line) is encountered, the program prints the centroid value CENT of the the first data line (which helps to identify the spectrum) and asks for the input of the SLX-angle THETA. At most 15 different angles THETA may be defined.
To skip one spectrum type 'S', to terminate type 'E'.

When a peak which was not present before (i.e. empty peak-nr) is encountered, the program prints the value of CENT and asks for the BRHO value of this peak.
To terminate type 'E'.

How to create the file ACMTX.TMP : Use the ACQUIRE command 'HELP SUM'.

MATRIX

COMMANDS

MINIMIZE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

Minimize one aberration and determine the corresponding optimal multipole strength SMOPT and the driving term DRIVE.

Format: MINIMIZE [aberr]

Parameter: aberr = aberration R12,T122,...
T126,T1226,...
T1266,T12266,...

Example: Optimizing the quadrupole Q2 means minimizing the aberration R12, i.e. MINIMIZE R12.

When you enter the MINIMIZE command, the program promts with MIN> and accepts subcommands, see:

MTX> HELP MINIMIZE command

MATRIX

COMMANDS

MINIMIZE

DELETE

Delete one line from the stored aberration data.

Format: DELETE [imeas]

Parameter: imeas = measurement-nr (=line number)

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MATRIX

COMMANDS

MINIMIZE

EXCLUDE

Exclude one of the stored aberration data points from the FIT and PLOT in the minimization.

Format: EXCLUDE [imeas]

Parameter: imeas = measurement-nr (=line number)

MATRIX

COMMANDS

MINIMIZE

INCLUDE

Include an aberration data point in FIT and PLOT for the minimization.

Format: INCLUDE [imeas]

Parameter: imeas = measurement-nr (=line number)

If a new point is to be included, the program asks for the multipolestrength for this measurement.

MATRIX

COMMANDS

MINIMIZE

RETURN

Return to MTX>

MATRIX

COMMANDS

MINIMIZE

PLOT

Plot the aberration under consideration vs the multipole strength. If the aberration has been fitted (see MINIMIZE-command FIT), the theoretical curve is displayed through asterisks (*) and the optimal point (if found) is plotted as X.

MATRIX

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

COMMANDS

MINIMIZE

MULTIPOLE

Change the multipole strength for one meas-nr.

Format: MULTIPOLE [imeas]

Parameter: imeas = meas-nr (=line number)

MATRIX

COMMANDS

MINIMIZE

LIST

List the aberration data under consideration. The list contains the following items:

MEAS-NR	= measurement number
FILENAME	= last file name given in the SAVE or READ command
DEGREE OF FIT	= degree of fit polynomial from which the aberration has been calculated
MULTIPOLE STRENGTH	= multipole strength (arbitrary units)
ABERRATION	= value of aberration
ERROR	= estimated error of aberration

INCLUDED = YES if point is included in FIT/PLOT
= NO if point is excluded from FIT/PLOT

MATRIX

COMMANDS

MINIMIZE

FIT

Fit the aberration under consideration as a function of the multipole strength and calculate the optimal multipole setting and the corresponding driving term in the minimum of this curve. The fitting is done with a polynomial of degree DEG (see command SET DEG) which must have the value 1, 2 or 3.

MATRIX

COMMANDS

CLEAR

Clear all stored data and calculated aberrations.
Clear BRHO-values is optional (CLEAR ALL)

MATRIX

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

COMMANDS

CLEAR

ALL

Clear BRHO-values as well to measure new spectrum

MATRIX

COMMANDS

SHIFT

Shift the stored peak-nrs up by one step, i.e. copy peak-nr 7 into peak-nr 8, copy peak-nr 6 into peak-nr 7, etc. The old data of peak-nr 8 will be destroyed and you gain space in peak-nr 1 in order to read in a new peak with ACREAD.

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP MEMPHIS (14 July 1986):

MEMPHIS

****

*** MEMPHIS ***

****

Authors: J.Meissburger, R.Korthues

User utility to configure the Big Karl MEMPHIS data acquisition system HARDWARE. Most commonly used to change coincidence conditions or to perform a system soft reset with default configuration loading.

For more details see: HELP EXAMPLE

MEMPHIS

EXAMPLE

1) Invoke MEMPHIS at DCL command level by typing:

$ MEMPHIS

2) MEMPHIS first displays the actual hardware status and prompts you for commands with:

MEM>

3) You may now change your software status by means of the SET command (See HELP SET). The most important commands are:

MEM> SET COIncidence ## or

MEM> SET NOCoincidence ##

which includes an MPS-ADC number ## in the coincidence (default coincidence time is 4.0 usec) or excludes it from coincidence.

I M P O R T A N T : At present at least one MPS_ADC has to run in coincidence with itself thus determining implicitely a trigger concidence with the external event start.

You may check your software status any time with the command:

MEM> SHO SOFt [ALL]

4) If you are satisfied with your software status exit MEMPHIS:

MEM> EXIT

The system then asks you if you really want to download this configuration into the MEMPHIS hardware: If so, respond "Y" and wait a few seconds (especially in case of a RESET) for the system to be configured.

5) The download link terminates operation at

MPSLINK>

command level. Watch a few seconds for ADC or system errors. If everything looks allright, exit the link with:

MPSLINK> EXIT

If you find many ADC errors (error 24) something is probably wrong with either the external event start or the hardware coincidence timing of the ADC's.

6) Your hardware is now ready for data taking. You may check again

its actual status with the DCL command:

```
$ MPSTATUS  or
$ ACSTATUS
```

You are now ready to run ACON an take data: Good luck !

7) In case of hardware trouble perform a HARD-RESET by typing

```
$ MEMPHIS
MEM> HARD
 ..... R
MEM> RELOAD
MEM> EXIT
```

The RESTORE command restores the last configuration generated by the previous MEMPHIS session (which usually is your desired experimental configuration)

MEMPHIS

EXIT

Invoke the MEMPHIS microprocessor link or exit back to DCL command level

MEMPHIS

SET

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

The SET command presets a device configuration for downloading with MPSLINK. Only the software status of MEMPHIS is modified by this command - hardware status only changes on request after EXIting the MEMPHIS utility !

MEMPHIS

SET

COINCIDENCE

SET COINCIDENCE n [time]

Include MPS_ADC (input unit) number n in the slow hardware coincidence

The optional coincidence time is the time in microseconds after the ADC-RTP pulse MEMPHIS will wait to check if the ADC went busy. (Default = 4.0 microseconds corresponding to the ADC gate time). If the ADC did not go busy after that time MEMPHIS will reject the event and perform a fast ADC reset.

(MPS_ADC's correspond to the MEMPHIS input units and are counted logically from left to right in the MEMPHIS system crates)

MEMPHIS

SET

NOCOINCIDENCE

SET NOCoincidence n

Remove MPS_ADC number n from slow hardware coincidence
>>> At least one MPS_ADC (input unit) has to be included in <<<
>>> coincidence with itself in MEMPHIS coincidence mode ! <<<

MEMPHIS

SET

MPS_ADC

SET MPS_adc n [parameters]

Configure the input/output bit range and position in the MEMPHIS event output word (128 bit) for a MPS_ADC

MEMPHIS

SET

MPS_ADC

INPUT

SET MPS_adc n INPut n [parameters]

The INPut parameter defines the input range (in bits) for the MPS_ADC (input unit). This will usually correspond to the output range of the connected physical ADC. (Default INPut = 11)

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MEMPHIS

SET

MPS_ADC

OUTput

SET MPS_adc n OUTput n [parameters]

The OUTput parameter defines the output range (in bits) of the MPS_ADC in the MEMPHIS event output word (128 bits). It is usually smaller than or equal to the input range defined by INPut.

MEMPHIS

SET

MPS_ADC

POSITION

SET MPS_adc n POSition n [parameters]

The POSition parameter determines the bit position of the MPS_ADC in the 128 bits long MEMPHIS event output word. If specified without a numerical value the next free position will be taken.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MEMPHIS

SET

EVENT_MODE

SET EVEnt_mode

Configure MEMPHIS for event (coincidence) mode. At least one ADC has to be in coincidence with itself or with the external EVENT START signal in order to define an event. MEMPHIS start may be selected either EXTERNAL by an EVENT START signal or INTERNAL by enabling internal MPS_ADC start (See HELP SET INTERNAL)

MEMPHIS

SET

SINGLES_MODE

SET SINgles_mode [MPS_ADC #]

Configure MEMPHIS for singles (wired-or) mode. Start mode is automatically set to INTERNAL with all (default) or the desired MPS_ADC's enabled for starting MEMPHIS.

MEMPHIS

SET

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

INTERNAL_START

SET INTernal_start [MPS_ADC #]

Enable MEMPHIS internal start mode. All (default) or the desired MPS_ADC's may start MEMPHIS to define a possible event. The external EVENT START signal is disabled.

MEMPHIS

SET

EXTERNAL_START

SET EXTernal_start

Configure MEMPHIS for external EVENT START. All internal MPS_ADC starts are disabled. MEMPHIS should normally be set to EVENT_MODE.

MEMPHIS

SET

WINDOW

SET WINdow # parameter

Configure the windows of unit #.

Parameters are:

ENABLE [#,...]	Enable windows. Every two numbers are the limits of one window. Default: the whole window enabled (0-8191).
DISABLE [#,...]	Disable windows. Every two numbers are the limits of one window. Default: the whole window disabled (0-8191).

MEMPHIS

SHOW

SHOW parameter

Displays information about the program status

MEMPHIS

SHOW

SOFTWARE

SHOw SOFtware [parameter]

Shows the present software status of your MEMPHIS session. This will eventually become the MEMPHIS hardware status if downloaded by MPSLINK after exiting the MEMPHIS software utility.

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

Parameters are:

ALL	-	Display whole software status.
STATUS	-	Display general software status.
MPS_ADC [#]	-	Displays the software status of the MPS_ADC units.
WINDOW [#]	-	Displays the software status of the window units.

MEMPHIS

SHOW

HARDWARE

SHOw HARdware [parameter]

Displays the actual MEMPHIS h a r d w a r e status.

Parameters are:

ALL	-	Display whole hardware status.
STATUS	-	Display general hardware status.
MPS_ADC [#]	-	Displays the hardware status of the MPS_ADC units.
WINDOW [#]	-	Displays the hardware status of the window units.

MEMPHIS

RESET

Set up a soft RESET for downloading by MPSLINK. This will reload the default hardware configuration when executed by MPSLINK. A soft reset may be performed without the need to exit ACQUIRE.

MEMPHIS

HARD_RESET

Set up a hard reset. The MEMPHIS hard reset may be used to unblock the MEMPHIS microprocessor in case of serious troubles. It can only be performed if ACQUIRE is not active ! The hard reset reloads the default configuration as does the soft reset.

MEMPHIS

RELOAD

Reloads the software configuration of the last MEMPHIS session.

MEMPHIS

ENABLE

ENAble [parameter]

Enable use of units, parameters are:

WINDOW # [,#] - Enable window unit # for use.

MEMPHIS

DISABLE

DISable [parameter]

Disable use of units, parameters are:

WINDOW # [,#] - Disable window unit # for use.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP MINIMIZE (14 July 1986):

MINIMIZE

MATRIX: MINIMIZE subsystem of MATRIX

MINIMIZE

DELETE

Delete one line from the stored aberration data.

Format: DELETE [imeas]

Parameter: imeas = measurement-nr (=line number)

MINIMIZE

EXCLUDE

Exclude one of the stored aberration data points from the FIT and PLOT in the minimization.

Format: EXCLUDE [imeas]

Parameter: imeas = measurement-nr (=line number)

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MINIMIZE

INCLUDE

Include an aberration data point in FIT and PLOT for the minimization.

Format: INCLUDE [imeas]

Parameter: imeas = measurement-nr (=line number)

If a new point is to be included, the program asks for the multipole-strength for this measurement.

MINIMIZE

RETURN

Return to MTX>

MINIMIZE

PLOT

Plot the aberration under consideration vs the multipole strength. If the aberration has been fitted (see MINIMIZE-command FIT), the theoretical curve is displayed through asterisks (*) and the optimal point (if found) is plotted as X.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MINIMIZE

MULTIPOLE

Change the multipole strength for one meas-nr.

Format: MULTIPOLE [imeas]

Parameter: imeas = meas-nr (=line number)

MINIMIZE

LIST

List the aberration data under consideration. The list contains the following items:

MEAS-NR	= measurement number
FILENAME	= last file name given in the SAVE or READ command
DEGREE OF FIT	= degree of fit polynomial from which the aberration has been calculated
MULTIPOLE STRENGTH	= multipole strength (arbitrary units)
ABERRATION	= value of aberration
ERROR	= estimated error of aberration
INCLUDED	= YES if point is included in FIT/PLOT
	= NO if point is excluded from FIT/PLOT

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

MINIMIZE

FIT

Fit the aberration under consideration as a function of the multipole strength and calculate the optimal multipole setting and the corresponding driving term in the minimum of this curve.
The fitting is done with a polynomial of degree DEG (see command SET DEG) which must have the value 1, 2 or 3.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP MINUIT (14 July 1986):

MINUIT

****
* M I N U I T *
****
Authors: F.James (CERN-MINUIT)
J.Meissburger, G.Slakov (MINFIT)

MINUIT is the name of a system of programs developed at CERN. These programs are used to minimize a user defined function; the classic example being the chi-square difference between a set of data points and a theoretical function. The two other important cases which MINUIT can handle are maximum likelihood problems and optimization problems.

The user may start from the beginning and, depending on which of the above tasks he wants to be done, write a program with his own function to be minimized. For the problem of getting a chi square fit between a theoretical function and experimental data, there is a utility called MINFIT which uses MINUIT to minimize the chi-square diffence between function and data.

MINUIT is a sophisticated set of programs. To use it, you are advised to consult the MINUIT manual obtainable from CERN computing library.

MINUIT

COMMANDS

MINUIT is told what to do and how to do it by various initializations

and commands; the initializations define parameters, the commands invoke calls to MINUIT subroutines.

The order of a command sequence is always the same:
The first line is a format-free title, the next lines are parameter definitions, followed by a blank line, which is in turn followed by the commands which tell MINUIT exactly what to do in order to minimize the function.

MINUIT

COMMANDS

PARAMETERS

The parameters are defined immediately after the title line.

Each parameter line is formatted as follows:

Columns 1 to 10:	Parameter number as referred to by user.
Columns 11 to 20:	Alphanumeric name for the parameter. (optional)
Columns 21 to 30:	Initial estimate of parameter value.
Columns 31 to 40:	Approximate error of parameter. (if 0 or blank, parameter is constant.)
Columns 41 to 50:	Lower bound on parameter. (if blank, no lower bound)
Columns 51 to 60:	Upper bound on parameter. (if blank, no upper bound)

Input all numbers in real format (ie. 2. as opposed to 2)

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MINUIT

COMMANDS

EXIT

This command indicates that the minimization commands are over, and the user would like to see the results.

MINUIT

COMMANDS

FIX

This command fixes a parameter at its present value until it is "released" by a RELEASE command. This command might be used if you feel that the given parameter is not allowing the other parameters to minimize properly.

The syntax for this command is:

Column 1 to 3: FIX
Column 11 to 20: Parameter number (use real format, ie 3.0 or just 3.)

MINUIT

COMMANDS

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MIGRAD

This command causes the program to perform a minimization using the MIGRAD technique (which is described in the user's manual).

The syntax for this command is:

Column 1 to 6:	MIGRAD
Column 11 to 20:	The maximum number of calls that can be made to the user's function in the MIGRAD minimization. If blank, the default is 1000. (use real format, ie. 500. or 500.0)
Column 21 to 30:	The tolerance on the value of the minimized function. If blank, the MINUIT assumes a default (See the MINUIT manual for further information.)
Column 31 to 40:	Tolerance on the stability of the error matrix. If blank a default value of 0.01 is assumed. (See the MINUIT manual for further information.)

MINUIT

COMMANDS

MINIMIZE

This command causes the program to attempt to minimize the users function by first calling SIMPLEX and then MIGRAD.

The syntax for this command is:

Column 1 to 8:	MINIMIZE

Column 11 to 20: Maximum number of calls to the users function.
(use real format, ie. 2000.0 or just 2000.)
If blank, the default is 1000.
Column 21 to 30: tollerance on function value. (default value 0.1)

MINUIT

COMMANDS

MINOS

This command causes an in-depth error analysis to be done on the present values of the parameters. Because of this, this command is normally only made when an minimum has been found.(ie. after a MINIMIZE, SIMPLEX, or MIGRAD command).

The errors produced are dependent on the uncertainty you have given your input data, so be sure these uncertainties are meaningfull.

The syntax for this command is:

Column 1 to 5: MINOS
Column 11 to 20: The maximum number of calls allowed to your user-defined FCN. (remember to use real format, ie. 800.)
If blank, the default value is 1000.
Column 21 to 80: The parameters that will have MINOS error analysis done to them. The format is every two columns equals one parameter. For example:

12345678901234567890 (These are column numbers, not to be included in file!)

MINOS b1b2b612 (where b is a blank)

means that MINOS will be done to parameters 1,2,6,12 in that order. If columns 21 to 80 are left blank, MINOS is done to all parameters.

MINUIT

COMMANDS

RELEASE

This command causes a parameter that has been fixed by a FIX command to be allowed to vary again.

The syntax for this command is:

Column 1 to 7:	RELEASE
Column 11 to 20:	The identification number of the parameter to be released. (use real format, ie. 4.0 or just 4.)

MINUIT

COMMANDS

SIMPLEX

This command causes the program to perform a minimization using a technique called the simplex method. See the MINUIT manual for further

information on this technique.

The syntax for this command is:

Column 1 to 7:	SIMPLEX
Column 11 to 20:	The maximum number of calls permitted to the user-defined FCN. (use real format, ie 900.) If blank, the default is 1000.
Column 21 to 30:	The tolerance on the minumum function value. If blank, the program assumes a suitable default.

MINUIT

COMMANDS

EXAMPLE

As an example of what MINUIT can do, let's assume you want to fit a quadratic polynomial to a set of data points.

Your user-defined function would be the sum of the chi-square differences between a set of data points and the quadratic polynomial, defined as

```
theoretical_function = PAR(1) + PAR(2)*X + PAR(3)*(X**2).
```

If the following numbers denote column number,
12345678901234567890123456789012345678901234567890123456789012345678901234567890
then a suitable sequence of instructions might be:

```
CHI-SQUARE FIT OF A QUADRATIC POLYNOMIAL      (This is the title)
       1. OFFSET    45.       1.
```

```
2. LINEAR    .02      .01
3.  QUAD     .7       .1

MINIMIZE
EXIT
```

Notice that all numbers are real-formatted, and that all numbers are in the proper range of columns. It is important to give a reasonable approximation to the expected minimum parameter value and its approximate error, otherwize MINUIT may find a minimum that is physically meaningless, or it may not find a minimum at all.

MINUIT

MINFIT

The MINFIT utility was developed to handle the problem of minimizing the chi square difference between a set of data points and a user defined function .The function actually being minimized is defined as:

F = sum of ((Yexperimental - Ytheoretical)/DYexperimental)**2

for all values of Yexperimental, and
where DYexperimental is the measured variance in the Y values, and Ytheoretical is the value of the user defined function at a particular X value.

The function to be fitted can be either a polynomial of up to degree 5, or it can be a user defined function of any type.

To begin execution of the MINFIT utility type:

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

$ MINFIT

MINUIT

MINFIT

ORGANIZATION

There are two basic options built into the MINFIT utility; it can either fit a polynomial to your data, or it can fit your user defined function to the data.

If you are fitting your own function to the data, you need two things. One, you need the fortran source for your function, and two, you need to compose a command sequence which will enable MINUIT to fit your function. The Fortran source for your function must be based on the file USERINF:THEORY.FOR, so copy this file into your own directory and modify it into your own THEORY.FOR. The commands to MINUIT are normally placed in a file called COMMAND.DAT. For information on which commands to use, type HELP MINUIT COMMANDS, or see the MINUIT manual.

If you simply want a polynomial fit for your data, then use the polynomial option, described in HELP MINUIT MINFIT POLYNOMIAL.

For information on the various input, output, and fitting options of MINFIT, type BKHELP MINUIT MINFIT INPUT_FILE.

To execute the MINFIT utility type $ MINFIT. The resulting interactive procedure will prompt you for all necessary information.

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Author: J.Meissburger

MINUIT

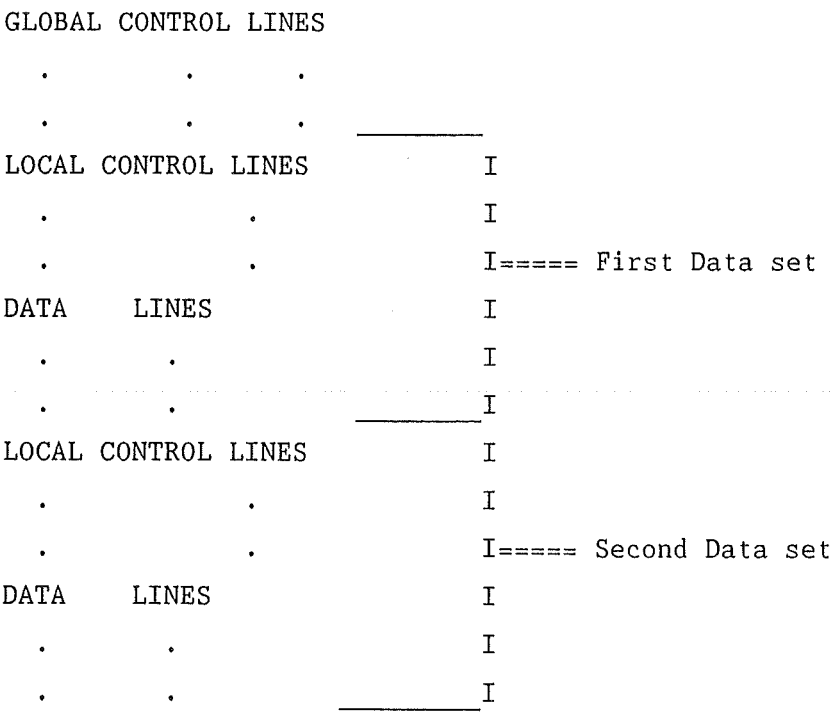
MINFIT

INPUT_FILE

The input file contains two things, experimental data and control information for the MINFIT utility.

Default values are supplied for everything except the expermental data, so no command lines are necessary, except of course if you want to change a control or start a new data set. Remember that each data set must be separated by a command line, even if it is only a blank line.

The input file is set up as follows:



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Author: J.Meissburger

ETC.

Any line whose first non-blank character is non-numerical will be interpreted as a command, including completely blank lines.

There are two types of command lines, global and local. A global control will alter that parameter for each data set, whereas a local control will alter that parameter only for the dataset it precedes.

Each control line has the format

CONTROL [PARAMETER(S)]

Global controls are:

PLOT

By default, no plots are printed. If plots of the theoretical function and of the difference between theoretical points and experimental points are desired, then include this command in the file.

EXTRAPOLATE [START FINISH DELTAX]

Normally the program will only calculate the theoretical function for the experimental values of X. If the user wants the theoretical function evaluated for more or less points than the number of data points EXTRAPOLATE should be used. It calculates the theoretical function at X values between START and FINISH, separated by DELTAX. The command EXTRAPOLATE with no numbers following will cause the fuction to be evaluated at the following default values:

START = minimum of Xexp. , FINISH = maximum of Xexp., and
0
DELTAX = (FINISH - START)/200.

RANGE XMIN XMAX

If the user has points in the data which fall outside the range of meaningful data, then this command will edit these data points from the fit; any point whose X value is below XMIN will not be included in the fit, and any point whose X value is above XMAX will also be ommitted.
By default all points are included in the fit.

NORMATION

By default normation is set so that the constant "1" is multiplied by the function in THEORY.FOR. If the data is relative data, with no absolute significance, then issue the command NORMATION and the program will compute a normation factor for the fit. (ie. a constant multiplier other than "1").

FILE [filename]

If the user would like to have a file created containing the extrapolated theoretical function and the parameters as determined by MINUIT, without all the other output produced by MINUIT, this command should be issued with an apropriate output filename. If no filename is included in the command line, the default filename will be MINUIT.DAT.

DEFSIG [DEFSIG]

This command changes the default value of DY (ie. the default value of sigma) to suit the user. If this

command is ommitted the default assumed by the computer is DEFSIG=1.

Local commands are:

TITLE Title

A title for the data set will be included in the output.

SKIP

This command, when encountered before a data set, will cause the data set to be printed in the input, but the data set will NOT be included in the fit.

The data points are inputted as follows:

Xexperimental Yexperimental DYexperimental
" " "
etc.

Notice that all the input is format free.

MINUIT

MINFIT

ERROR_ANALYSIS

The errors that MINUIT calculates are the estimated errors of the current parameter values. These errors are directly related to the sigmas of the data points as provided by the user. For this reason, in order

to obtain meaningful error estimates on the parameters, it is necessary to provide meaningful error estimates on the input data. If you don't know the error in the input data, then MINFIT can produce estimates by itself, providing the function has been minimized once already with the original error estimates.

This redefinition of the sigmas of the input data is done by issuing the command

CALL FCN 6.

in the command file, or if you are working with a polynomial, the "error code" inputted to the MINFIT procedure should be 2.

Notice that if the sigma values are all equal, MINFIT computes the least squares fit for your data.

MINUIT

MINFIT

POLYNOMIAL

In many cases it will be desireable to fit the data to a simple polynomial of up to degree 5. For this case, a special option is available to the user that is particularly easy to use. In it, the polynomial is already defined, and the user need not worry about writing a theoretical function and producing a command file for MINUIT, the polynomial option of MINFIT does this for you.

The polynomial is of the form:

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Author: J.Meissburger

F(X) = Par(1) + Par(2)*(X) + Par(3)*(X**2) + Par(4)*(X**3) + ...

The parameters returned by MINUIT simply plug into this formula to provide you with the fitted function.

To run this option, simply produce an input file and follow the directions given to you by the MINFIT procedure which is executed with the command

$ MINFIT

If the procedure is unable to provide you with a fitted function, try reducing the degree of the fitting polynomial.

MINUIT

MINFIT

THEORY

A sample THEORY function is given below:

```
CC*****************************************************************
CC
CC
CC       FILE: THEORY.FOR        MINFIT MODULE THEORY
CC       ================        J.MEISSBURGER 3-NOV-82
CC                               MODIFIED: GREG SLAKOV 12.6.84
CC
CC*****************************************************************
CC
CC
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
C   REAL*8 FUNCTION THEORY (PAR, NFLAG,XARG)
CC
CC    FUNCTION THEORY RETURNS THEORETICAL FUNCTION VALUE DEPENDING ON
CC    UP TO 55 PARAMETERS PAR(I)
CC
CC    NFLAG IS A SWITCH.  IT IS SET TO 1 FOR INITIALIZATION OF ALL OF THE
CC    CONSTANTS IN THE FUNCTION THEORY (IE., ANYTHING THAT DOES NOT DEPEND
CC    ON THE VECTOR PAR(I))
CC
C      IMPLICIT REAL*8 (A-H,O-Z)
CC
C   PARAMETER(MAX_POINTS=100,MAX_DSETS=20)
CC
C      COMMON /DATA1/ X(MAX_POINTS,MAX_DSETS),
C     *     Y(MAX_POINTS,MAX_DSETS),DY(MAX_POINTS,MAX_DSETS),
C     *     NSET,NDAT(MAX_DSETS),INPAR
CC
C      COMMON /FIT2/ I,II,COMF
CC
C   DIMENSION PAR(1)
CC
C   GOTO (100,200,300) , NFLAG
C100        CONTINUE
CC
CC       INITIALISATION STEP
CC       DEFINE (IE CALCULATE OR SET) ALL CONSTANTS OF THE FUNCTION
CC  IN THE SPACE BETWEEN LINE 100 AND RETURN.
CC
CC
C   RETURN
C200        XX=X(I,II)
CC
CC  THIS IS WHERE THEORY IS CALCULATED - DON'T WASTE ANY
CC  COMPUTING TIME DURING THIS STEP SINCE IT WILL LOOP
CC  THROUGH MANY TIMES
```

```
CC
CC       DEFINE THE THEORETICAL FUNCTION STARTING AT LINE 250.
CC
C250        CONTINUE
CC
CC  THIS IS THE STANDARD POLYNOMIAL FUNCTION.
CC
CC  THEORY = PAR(1)+XX*(PAR(2)+XX*(PAR(3)+XX*(PAR(4)+XX*
CC     *           (PAR(5)+XX*PAR(6)))))
CC
CC          THIS FUNCTION IS A GAUSSIAN DISTRIBUTION, IT MAY BE
CC  USED TO FIT A GAUSSIAN PEAK
CC
C   THEORY = PAR(1)*EXP(-(((XX-PAR(2))**2)/PAR(3)))
CC
C   RETURN
C300        XX=XARG
CC
CC       THIS PART IS CALLED TO EVALUATE THE
CC       VALUE OF THEORY FOR THE EXTRAPOLATION POINTS.
CC
C   GOTO 250
C   END
```

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP MOCAL (14 July 1986):

MOCAL

****
***** M O C A L *****
****
Author: D.Paul

The Big Karl MOrris chamber CALibration utility
Last update : January 1984

Most important commands	: MOC> BKHELP COMMANDS
To see an example	: MOC> BKHELP EXAMPLE
Standart run (one chamber plane)	: MOC> BATCH GO
Sign parameter in software	: MOC> BATCH SIGN
More commands	: MOC> BKHELP MORE

==========

MOCAL

EXAMPLE

Typical procedure to get a new calibration for one plane:

a) Type ACSTATUS and notify the actual version of ACON (filenames)
Type ACPARAM to create the default (no parameter modification) version of ACON.

b) Illuminate chamber by appropriate mistuning of Q2, Q3 and/or sweeping if necessary (white spectrum). Take list mode data on tape !

c) Dump spectrum with ACON>DU,D and make a note in the logbook

d) EXIT ACON, stop subprocess and type MOCAL

```
MOC> READ ACAxxxx.SIN        ! read calibration spectra
MOC> ARRAY 1                 ! define array # of wire spectrum
MOC> SCOPE                   ! display spectrum for check
MOC> FIND 300 1700           ! find peaks within limits of
                             ! wire number spectrum
MOC> DISPLAY FLUCT           ! check fluctuations (<4% !)
MOC> SCOPE 200 300           ! check beginning of spectrum
MOC> SCOPE 1500 300          ! check end of spectrum
MOC> KILL 1                  ! delete misidentified peak No. 1
MOC> STORE NX1 comment       ! store wire number calibration

MOC> ARRAY 2                 ! specify array for drift time
                             ! analysis
MOC> SCOPE 1 2000            ! check spectrum
MOC> DRIFT 300 1500 16       ! get drift time spectrum binned
                             ! in 16 bins of same weight
MOC> DISPLAY WEIGHT          ! show result
MOC> STORE ND1               ! store drift time calibration

MOC> EXIT                    !
     save calibration (Y/N)  ! type Y to save calibration
```

e) Type ACPARAM and build ACON process including
the new calibration by specifying

[USER.MORRIS]MOINI.FOR

as filename.
Hit <RET> when prompted for the calibration file

f) Hit <RET> when asked if you want to invoke MPS

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

>>>>> G o o d L u c k <<<<< and watch what's coming out !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

MOCAL

COMMANDS

READ	read in calibration spectra (single files)
ARRAY	get array to work on
FIND	find peaks in a wire spectrum and set windows
SWP	switch to a mode, where there is prompted for all param.
KILL	possibility for corrections
DRIFT	cut drift time spectrum into equal weighted bins
SCOPE	scope array - and , when calibration done: mark windows
DISPLAY	optical control on several parameters
STORE	store away done calibration of a parameter
BATCH	call batchfile (ready programmed runs)
EXIT	save calibration (Y/N) Y

>>> More commands please type HELP MORE <<<

MOCAL

READ

READ filename [,from array to array]

filename	: name of a single-file	DEFAULT
array	: range of arraynumbers	read all arrays

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Author: J.Meissburger

>>> reads in arrays of a single file and stores them in a buffer
>>> use the command 'ARRAY' to restore an array from this buffer
>>> I F : exactly one arraynumber given THEN array is restored automatically

MOCAL

ARRAY

ARRAY number

number : number of the array to be restored

>>> restore an array from the arraybuffer
>>> initialize for calibration on next parameter

MOCAL

FIND

FIND lower channel,upper channel[,wire spacing,threshold,step,wobbel]

		DEFAULT
lower channel	: approximate beginning of spectrum	/ should be given
upper channel	: approximate end of spectrum	when bad spectrum
wire spacing	: approximate spacing between wire peaks	/ given by program
threshold	: minimum counts in a peak to accept a peak	
step	: iteration step when searching peaks	/ 1 channel
wobbel	: 1 = look for minimum between peaks	/ "1"

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Author: J.Meissburger

>>> find peaks in a wire spectrum and integrate them
}}} in case of no success see also 'SWP'

MOCAL

DRIFT

DRIFT lower channel , upper channel [, number of bins]

		DEFAULT
lower channel	: lower threshold for a valid event	
upper channel	: upper threshold for a valid event	should be given
number of bins	: number of equal weighted bins	16 bins

>>> cut drifttime spectrum into equal weighted bins

MOCAL

BATCH

BATCH [filename]

filename : filename or logical name for a batchfile

>>> call a ready programmed sequence of commands
>>> the program will prompt for parametervalues
which are not given in the batchfile
>>> the logical name for the batchfile can be
defined before entering the program with the
command $ DEFINE (VAX-VMS manuals)

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

>>> logical names for the batchfiles
[USER.MORRIS]GO.BAT,GOGO.BAT are
automatically defined GO,GOGO when entering
the program.

}}} example : MOC> BATCH GO
calibration of one chamberplane

MOCAL

STORE

STORE tablename , comment

tablename : conventional name used for the calibration of
the relevant parameter

comment : comment , which is written into the table header

>>> store away a ready done calibration
}}} (name-conventions should be looked up in the 'REFERENCE'-file)

MOCAL

SCOPE

SCOPE lower channel [, range , compress factor]

DEFAULT

lower channel : first: scope all
then:escape from display

range : number of channels to 100ch or old value

be displayed

compress factor : 'resolution' 1ch or old value

>>> scope current array
>>> the program is set to a mode , in which it replots
after valid commands (except DISPLAY).
The command can be simply given instead of the
lower channel (e.g KILL , FIND , SET , FIX etc.)
>>> on return , the program exits the scopemode
>>> I F windows are present THEN they are marked.
The numbers are the peak or binnumbers.
See also: KILL

MOCAL

DISPLAY

DISPLAY option

LIMITS	: lower limits of windows (default option)
FLUCTUATION	: fluctuation of spacings between window centroids - the difference from the mean value is given in percent
WEIGHT	: normated integrals of windows
CENTROID	: centroids of windows
WALK	: walk of limits compared to old calibration (This needs a tablename as a parameter)

>>> x-axis = window number , y-axis = "option"

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MOCAL

DISPLAY

WALK

WALK tablename

tablename : table of referencefile to be compared with new calibration

>>> compare current calibration with old calibration, the difference in channels is displayed.

MOCAL

CREATE

CREATE comment

>>> assemble new calibration file from stored tables (see 'STORE')
>>> the reference file, which had been read in at the beginning of the program , is used as a pattern
>>> reset all recalibrated tables , keep tables which are not recalibrated
>>> dump this file on the default directory

MOCAL

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Author: J.Meissburger

MORE

GET	read in a table of an old calibration file, integrate current array with this calibration (e.g. compute window integrals , centroids for display)
RESTORE	restore table from memory,integrate current array with this calibration.
DIRECTORY	list names of stored tables
TYPE [x]	type current table or stored table 'x'
CLEAR	clear graphic display
DUMP	dump for private use or when no reference file can be given (else use 'CREATE' or 'EXIT')
OFFSET	add offset on an old calibration table (other particles)

SET,FIX,ADD,SUBSTRACT,HEADER for manipulating a table

MOCAL

CLEAR

>>> clear graphic display , nothing is initialized

MOCAL

DUMP

DUMP [filename,consistent routine,tables,mpstables,comment]

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

filename : name of calibrationfile
consistent
routine : name of compatible fortran module (BK_USER_PAR)
tables : these tables are dumped (only last version)
DEFAULT: all tables stored
mpstables : these tables will be converted to memphis
batchformat when using initialization module
"MOINI"

MOCAL

DIRECTORY

DIRECTORY

>>> list all stored tables, new versions already stored are marked with
"(recalibrated)"

MOCAL

TYPE

TYPE [tablename]

DEFAULT
tablename : name of stored table current table

>>> type table on terminal
If no name is given type current table

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

MOCAL

INITIALIZE

INITIALIZE

>>> initialize windows,integrals etc. of the current table

MOCAL

SET

SET limit#,value [,limit#,value,...]

limit# : number of limit to be changed
value : value (channel)

values are allowed to be negative

MOCAL

ADD

ADD tablename

tablename : name of a stored table to be added
>>> perform a vektor addition of a table from the table directory

and the current table

MOCAL

SUBSTRACT

SUBSTRACT tablename

tablename : name of a table on the table directory to be substracted from the current table.

>>> see also ADD

MOCAL

FIX

FIX lower limit , correction , upper limit , correction

lower limit : first manipulated limit
correction : value to correct lower limit
upper limit : last manipulated limit
correction : value to correct last limit

>>> generate a correction table .
All values between the lower and upper limit are computed by a linear interpolation between the corresponding corrections. This correctiontable is then added to the existing table.

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Author: J.Meissburger

MOCAL

HEADER

HEADER singlefile,arraynumber,size

		DEFAULT
singlefile	: information in table header	old name
arraynumber	: information in table header	old value
size	: size of relevant parameter	old value

>>> size is important , as it might be a compiletime constant

MOCAL

SWP

SWP >>> switch between two modes

promptmode : prompt for all parameters ,
Force prompted parameter input when using FIND

normalmode : short hand parameter prompting
Restrict parameter prompting to important parameters

MOCAL

KILL

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

KILL peak# [,peak#,....]

peak# : peaknumber of peak to be deleted

>>> delete misidentified peak in wire spectrum .
}}} peaknumbers can be obtained from graphic display (see SCOPE)
}}} KILL can be conveniently used in the 'scope-mode '.
the relevant part of spectrum is reploted
If peaks are missing type SWP

MOCAL

OFFSET

OFFSET value

value : offset to be added

>>> add constant offset on all nonzero elements of a
calibration table
(correction of drifttimetable , eg. other particles)

MOCAL

GET

GET calibrationfile,tablename

DEFAULT

calibrationfile : old calibrationfile none

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

tablename : table to be read
and restored in the
buffer of the current
array

>>> read in old calibration file for comparison
see also RESTORE

MOCAL

RESTORE

RESTORE tablename

tablename : name of table to be restored

>>> restore table from table store (see DIRECTORY)
>>> if an array is currently present ,the
calibration will be applied on it :
integrals & centroids of bins are computed .
(see DISPLAY)

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP NEWS (14 July 1986):

NEWS

```
**********************************************************************
****************** BK-VAX NEWS:  4-Jul-1986  ************************
**********************************************************************

        News about the Big Karl operating system on VAX and PDP11
        *********************************************************

        To get a hardcopy use:

                $ BKHelp/output=bkhelp.lis NEWS...     and
                $ Print/delete bkhelp.lis

at DCL command level. The $ BKHelp command provides you with the
more detailed information on Big Karl operating  system utilities.
(See $ BKHelp BKHELP)
```

NEWS

PRINTERS

Besides the standard systems line printer queue SYS$PRINT two more printers are available in the IKP main building, room 340 for either lineprinter-, memo- or letter-quality printing.

SYS$LETTER	is queued to a LA100 letter/memo printer
SYS$LASER	is queued to a LN03 high quality laser printer

For more information see: $ BKHelp PRINTERS...

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

NEWS

TERMINALs

For new terminal DCL and Fortran configuration support use:

```
$ BKHelp TERMINALs...          and
$ BKHelp BKLIB BKUTY TT*...
```

NEWS

SYSTEM_layout

For information on the Big Karl VAX-11/780 site-specific system layout (in addition to VMS-HELP) use:

```
$ BKHelp SYSTEM...
```

NEWS

RUNOFF

A sample RUNOFF input sample file is available to show most features used on the LN03 laser printer. For more information use:

```
$ BKHelp RUNOFF...
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP PATCHY (14 July 1986):

PATCHY

********** PATCHY on BK-VAX **********

$ YPATCHY CERN PATCHY main utility

$ YEDIT	Edit material of old files with cradle material to new files
$ YINDEX	Print index for a PAM file
$ YLIST	Card-for-card listing of a PAM file
$ YSEARCH	Search a PAM file for cards containing any text string as specified by the cradle and possibly replace strings.
$ YSHIFT	Copy OLD to NEW, activating/deactivating tagged cards and converting blank to single-C cards or vice versa.
$ YCOMPAR	Compare NEW against OLD for identical contents.
$ YTOBIN	Conversion card-image to compact binary
$ YTOBCD	Conversion compact binary to card-image
$ YTOCETA	Conversion from binary to CETA (tape must be mounted /FOR)
$ YFRCETA	Conversion from CETA to binary (tape must be mounted /FOR)

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP PLSORT (14 July 1986):

PLSORT

****

*** P L S O R T ***

****

Author: L.Zemlo, C.Sukoszd

VERSION 12-Dec-84

MEMPHIS and ND6600 general purpose sorting utility

Sorting utility for BIGKARL and ND6600 list mode data providing user-defined pseudo-ADC's and parameters.

When you execute PLSORT at DCL command level you will first be asked for a Fortran file specifying BK_USER_INI

This subroutine will be linked and executed as task PLINI to do initial parameter and table value computations. It will also define the filename of a subroutine BK_USER_PAR to redefine the pseudo-ADC's MPS_ADC(1 .. 16) .

If your don't need pseudo-ADC's just type <RET> for the filename specifying BK_USER_INI.

To define extra user parameters PARAM(1 .. 30) you will then be asked to specify the name of a file providing a subroutine DO_PARAMETERS. Typing <RET> will default all parameters to be 2K copies of the MPS_ADC's.

The header of your DO_PARAMETERS definition file (separated by a form feed <FF> from the program source text) will be copied to the file PLSORT.PAR and used by PLSORT for documentation.

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

PLSORT

Input

List mode data from MPS (MEMPHIS system) or MPA (ND 6600 system).
Decoded data are filling arrays MPS_ADC (INTEGER*2 type) in
COMMON /BK_EVENT/, see BKCOMM.FOR

PLSORT

Pseudoparameters

Pseudoparameters are defined (max number 30) by user in DO_PARAMETERS subroutine (array PARAM (INTEGER*4 type) in COMMON/PARCOM/).
Their values should lay in range 1 - PAR_SIZE.
PAR_SIZE must be defined for each pseudoparameter in the same subroutine (max PAR_SIZE = 2048).
The values of pseudoparameters outside given range are neglected.

PLSORT

Gates

Ther user can define up to 40 gates in coincidence or anticoincidence.
Among them up to 10 can be defined as 2-dim gates (areas of interest)

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

PLSORT

Complex gates

User can define up to 10 complex gates in coincidence or anticoincidence. The complex gates from 81,83,85...99 are in coincidence, the gates 82,84,...100 are in anticoincidence. For the condition list of these complex gates every preceding gate number can be used (also preceding complex gate numbers!). For more information see CONLIST and DCOM !

PLSORT

Arrays

User can define up to 30 1-dim arrays (size automatically defined by size of chosen pseudoparameter) and max two 2-dim arrays .

The 2-dim arrays may have low resolution (128*128 points), or high resolution (640*640 points). For high resolution plots there is no possibility of making a projection (see. CUT).
Filling of those arrays can be conditioned by up to 10 conditions chosen from previously defined gates. For more information see ARRAY, CONLIST and SCOPE 2DIM.

PLSORT

Units

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

PLSORT uses the following input/output units:

TTY as input (interactiv mode) - unit number 5
TTY as output (interactive mode) - unit number 6
Temporary unit used for all transfers of data - unit number 30
Procedures batch-files as input - unit numbers 41,42,43,44....
Events (list mode data) - unit number 32
PLSORT.LOG (full documentation of program execution) - unit number 33

PLSORT

Constants

Up to 512 constants stored in CNST array of COMMON/CON/ can be used for defining pseudoparameters in DO_PARAMETERS subroutine. First 20 of them are equivalenced with constants C1,C2, ... ,C20.

PLSORT

MESSAGE

Message line starts with '!' or ';' after prompt PLS>.
Copied to PLSORT.LOG file without affecting the execution of the program.

PLSORT

ADD

Add two 1-dim arrays: ARRAY1 + ARRAY2 and locate product in ARRAY3
Transfer of channels according to the formula:

a1*ARRAY1+a2*ARRAY2+offset => ARRAY3

Format:

AD[D] i1,i2,i3,a1,a2,offset<CR>
Comment string (one line,not more then 64 characters)<CR>

	Default
i1...3 - number of ARRAY1...3 (value 1-30)	none
a1,a2 - values of multiplication factor	1.
offset - offset	0.

PLSORT

BATCH

Terminates execution of a Procedure batch-file. This command m u s t be the last statement in each procedure-file (see example below). Procedure files can be called using the PRO command (see there). Exeptionally for calling procedure-files from the interactive level the BATCH command is also allowed (for keeping consistency with previous convention).

Format: B[ATCH] [filename]

filename must be given only for calling a procedure-file from the interactive level !

Procedure file structure:

PLSORT INPUT DATA <-- first line

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Author: J.Meissburger

```
.
.                          <-- input commands
.
BATCH                      <-- last line
```

PLSORT

PROCEDURE

Format: PR filename

You may build procedures from sequences of valid PLSORT commands. These commands will be executed by calling the file wich contains them. The PR[OCEDURE] command is used to call a procedure file. Procedure files can be nested the same way as subroutines in Fortran. (For calling a procedure file from the interactive level you may use - exceptionally - also the BAT command <see there>).

Procedure file structure:

```
PLSORT INPUT DATA   <--- this  m u s t  be the first statement
   .
   .
   .          <--- These are valid PLSORT commands (Including PRO !!)
   .
   .
BAT                <--- this  m u s t  be the last statement
```

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Author: J.Meissburger

PLSORT

CHANGE

Change channel setting in gate definition

Format: CH[ANGE] ng,np,nl,ng

	Default
ng - gate number	none
(if ng<0 then the last ABS(ng) gate-pairs will be deleted!)	
np - parameter number	old value
nl - lower channel	old value
nu - upper channel	old value

PLSORT

REPLACE

Replace definition of 1-dim array

Format: REP[LACE] na,np,con_list

na - array number

np - parameter number

con_list - list of gates (till 10) terminated by 0

(for more details see CONLIST)

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Author: J.Meissburger

PLSORT

CLEAR

Clear (zero) all defined arrays

Format: CL[EAR]

Attention: Arrays which were not explicitly defined
are not erased ! (e.g. saved arrays)

PLSORT

SET

Set values of constants in COMMONS: CON,INF,STR

PLSORT

SET

CON

Set value for constant used in user DO_PARAMETERS subroutine

Format: SE[T] C[ON] n,v

	Default
n - number of element in CNST array	none

v - value of CNST(N) old value

PLSORT

SET

INF

Used to change actual configuration of program
(see listing of PLCOMM.FOR)

Format: SE[T] I[NF] n,iv

	Default
n - number of element in COMMON /INF/	none
iv - value of this element	old value

Don't use if you are not absolutely sure what are you doing
- you can make terrible mess !!!

PLSORT

SET

STR

Change string in COMMON /STR/ or restore array
These strings are used to create standard filenames:
String # 4 - filename of list mode data from MEMPHIS
(eg. MTA0:ACA$$$$.LM0)

5 - filename for dump file
6 - filename for definition file
7 - filename for BATCH input file
8 - filename for SHOWPLOT file

Format: SE[T] S[TR] n,new string<CR>

n - number of string replaced by new string
if n<0 then restore(activate) array -n

PLSORT

CUT

Project part of 2-dim array on X or Y axis
Result saved in array # 30

Format: CU[T] istart,data1, ... ,dataN,0
where dataI consists of 4 values: ax,ia,nl,nu

	Default
istart - define location of cut spectrum in array # 30 (beginning channel = istart*128+1)	0
ax - Y or X for projection on X or Y axis, respectively	none
ia - 2-dim array number (31 or 32)	31
nl - lower channel of cut in ax axis	1
nu - upper channel of cut in ax axis	128

THERE IS NO POSSIBILITY OF PROJECTION FOR HIGH RESOLUTION PLOTS !

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Author: J.Meissburger

PLSORT

2DGATE

Define 2-dim gate (area of interest)

Format: 2DG[ATE] ng,nc,npx,npy

Where: ng - gate number (from 79 downto 61)
(if ng<0 then last ABS(ng) 2DG-pairs will be deleted)
nc - contour number (must be previously defined)
npx,npy - parameters in X and Y axis respectively

PLSORT

CONTOUR

Define contour for 2-dim gate (area of interest)

Format: CO[NTOUR] list_of_coordinates

Where list_of_coordinates - set of pairs of X,Y coordinates separated by comma or space and terminated by <CR>

PLSORT

DCOM

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Author: J.Meissburger

Define complex gates:

User may define up to 10 complex gates (gate numbers 81 to 100). The complex gates with odd number are in coincidence, the ones with even number are in anticoincidence.

These complex gates can be used for conditioning one- or twodimensional arrays during the sort the same way, as the simple gates.

Format: DC[OM] gn conlist

Where

gn is the complex gate number to define. Default: next free
(If gn<0 then last ABS(gn) complex gate-pairs are deleted)

conlist List of gate numbers (maximum 10). Default: none
(Terminated by 0)
In the condition list every existing gate number may appear, which are less then gn.
For more information see CONLIST.

PLSORT

DELETE

Delete 1-dim array from list of arrays

Format: DEL[ETE] n

Where n - array number
If n<0 then last ABS(n) arrays are deleted.

PLSORT

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

DFL

Set default values for configuration definition

Format: DF[L]

Function:

1) defines 10 1-dim arrays for first 10 parameter (without condition)
2) releases all gates and contours
3) deletes arrays 11-32
4) clears CNST array in COMMON /CON/
5) sets default values for strings in COMMON /STR/
   # 4 - MTAO:ACA$$$$.LMO
   # 5 - PLA$$$$.DMP
   # 6 - PLA$$$$.DEF
   # 7 - PLA$$$$.BAT
   # 8 - PLA$$$$.PLO
6) sets default values for WINDOWS

PLSORT

SCOPE

Display 1-dim or 2-dim array !!! Illegal in batch mode !!!

PLSORT

SCOPE

1-dim

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Author: J.Meissburger

Display 1-dim array

Format: SC[OPE] na,nl,nu,y_max

		Default
Where:	na - array number (1-30)	none
	nl - beginnig channel of display	old value for this array
	nu - end channel of display	old value for this array
	y_max - maximal value of vertical axis	0

If y_max=0 then maximal value of vertical axis is equal to maximum number of counts per channel in displayed range (but y_max>9)

PLSORT

SCOPE

1-dim

Array

Enables you to plot another array between the previously defined channels but with a new scale factor WITHOUT ERASING the display. So you can plot a spectrum over another one and can directly compare them. Always the parameters of the LAST spectrum are kept ! Execution: Cursor in displayed frame, then press A and answer the questions. Default values are always the last ones.

PLSORT

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

SCOPE

1-dim

Clear

Clear displayed range of array.
When range 1-2048 is displayed make array nonactive

Execution - CURSOR in displayed frame and press C

PLSORT

SCOPE

1-dim

Expand

Expand part of display between markers

Execution - CURSOR between markers and press E

PLSORT

SCOPE

1-dim

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

Full

Display array between channels 1-2048

Execution - CURSOR in displayed frame and press F

PLSORT

SCOPE

1-dim

Integrate

Integrate part of the array between markers

Execution - CURSOR between markers and press I

PLSORT

SCOPE

1-dim

Logarit

Log scale in Y-axis

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

Execution - CURSOR in displayed frame and press L

PLSORT

SCOPE

1-dim

Mark

Set marker

Execution: Move CURSOR to chosen channel and press M

On display returned channel number and number of counts in this channel

PLSORT

SCOPE

1-dim

Outlp

Write in *.LOG file contens of array between markers

Execution - CURSOR between markers and press O

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

PLSORT

SCOPE

1-dim

Point

Change display from histogram to point

Execution - CURSOR in displayed frame and press P

PLSORT

SCOPE

1-dim

Quit

Return to PLS>

Execution - CURSOR in displayed frame and press Q

PLSORT

SCOPE

1-dim

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

Replot

Return to histogram mode and replot display

Execution - CURSOR in displayed frame and press R

PLSORT

SCOPE

1-dim

Scale

Replot with changed Y-scale

Execution: Press S and type new y_max value

PLSORT

SCOPE

1-dim

Window

Store information about range and all markers of displayed arrayes.
These information may be stored in 9 registers called back

by pressing numbers 1-9.

Execution: Press W and type register number.

Default definition:

	range	markers
# 1	1-256	1,128,129,256
# 2	257-512	257,384,385,512
# 3	513-768	513,640,641,768
# 4	769-1024	769,896,897,1024
# 5	1025-1280	1025,1152,1153,1280
# 6	1281-1536	1281,1408,1409,1536
# 7	1537-1792	1537,1664,1665,1792
# 8	1793-2048	1793,1920,1921,2048
# 9	1-2048	1,128,129,256,257,384,385,512,513,640,641,768, 769,896,897,1024,1024,1152,1153,1280, 1281,1408,1409,1536,1537,1664,1665, 1792,1793,1920,1921,2048

PLSORT

SCOPE

2-dim

Display 2-dim array

Format: SC[OPE] na,min,max

Where:	Default
na - array number (31 or 32)	31
min - lower level in number of counts	1
max - upper level in number of counts	1000000

Function: Displays coordinates corresponding to channels containing

number of counts between min and max.
For high resolution plots the 640*640 channels are grouped in 128*128 groups,containing 5*5 channels each. The content of these groups is incremented during the sort, though it is maximized to 127. During the display procedure,only those groups are (or are not) plotted, whose content is between min and max.

PLSORT

SCOPE

2-dim

Cursor

Activate cursor

Execution: Press C, to get channel coordinates move coursor to chosen place and press space. You get coordinates of nearest channel.

PLSORT

SCOPE

2-dim

Define contour

Define contour for 2-dim gate

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

Execution: Press D, then enter the contour number to define (if you enter -1, the last contour will be deleted). Then move cursor to the chosen position and press D to store the coordinates. For finishing contour definition press E.

PLSORT

SCOPE

2-dim

Replot

Replot with new values of min and max

Execution: Press R and give required new values of min and max

PLSORT

SCOPE

2-dim

Quit

Return to PLS>

Execution: Press Q

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

PLSORT

SCOPE

2-dim

Show contour

Show previously defined contour

Execution: Press S and type contour number

PLSORT

SCOPE

2-dim

End

Termination of contour definition

Execution: Press E

PLSORT

DUMP

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

Save or read saved configuration (PLSORT internal format)

Format: DU[MP] key,filename

key - keyword to control DUMP function

filename - name of file of saved configuration

List of keywords:

R - read full configuration

RALT - read full configuration of sorts before FEB-1983

RINF - read configuration definiton only

W - save full configuration - this keyword does not want filename

WD -save full configuration - this keyword wants a filename

(If the destination file already exists, it asks for replace. In batch mode this option does not replaces the existing file, but leaves the DUMP subroutine.)

WINF - save configuration definition only

WSIN - write arrays in format compatible with VAXUNF program

PLSORT

EXIT

Exit program and close all files

Format: E[XIT] Y[ES]

PLSORT

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

GATES

Define 1-dim gate

Format: G[ATE] np,nl,nu

Where: np - parameter number
nl - lower limit
nu - upper limit

PLSORT

INTEGRATE

Integrate between channels incl. background subtraction

Format: I[NTEGRATE] na,nl,nu

Where:	Default
na - array number (1-30)	none
nl - lower channel	1
nu - upper channel	last channel of array

PLSORT

NDSORT

Sorting of MPA list mode data - Nuclear Data 6600

Before calling PLSORT tape must be mounted: MOU MT.../FOR

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

Format:

ND[SORT] ntu,filename,nb,nr ---- if ntu= 0 or 1 (Tape Sort option)

2,S,filename1,nb,nr ---- Disk Sort option

2,C,filename1,ntu,filename - Copy from tape to disk

Where:	Default
ntu - number of I/O unit (0 or 1 for tape, 2 for disk)	
filename - name of file with data on tape	none
filename1- name of I/O file on disk	none
nb - number of first record to be sorted (nb>3)	actual position
nr - number of records to be sorted	999999

PLSORT

PARAMETERS

Display and print present configuration and check set-up.

Format: PA[RAMETER] key

key - optional: if key(1:1)= P, print configuration on line printer

if key = [P]E print configuration errors

if key = [P]W print warnings and errors

if key = [P]C print cross-references, warnings and errors

PLSORT

READ

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

Read one 1-dim array form DUMP file or from SHOWPLOT-format file

Format: RE[AD] filename,ns,nd

Where: filename - name of DUMP or SHOWPLOT file (source)
ns - array number in source file
ns must be -1, if transfering a SHOWPLOT file !!!
nd - destination array number

PLSORT

SAVE

Manipulate (expand, compress, shift) and save 1-dim array

Format: SA[VE] ns,nd,shift,expand<CR>
comment<CR>

Where:	Default
ns - source array number	none
nd - destination array number	none
shift - shift	0.
expand - expand (or compress when <1)	1.
comment - one line but not more then 64 characters	

PLSORT

ARRAY

Define 1-dim array (spectrum) and conditions

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

Format: AR[RAY] np,con_list

Where: np - parameter number

con_list - list of previously defined gates (max=10)

(for more details see CONLIST)

PLSORT

CONLIST

There is a possibility of forming logical conditions using the previously defined one or two-dimensional gates. The following example explaines the use of them.

Let A,B,C and D be gate numbers. The following condition-list

A B D -B C -A D

means:

(A.AND.B.AND.D).OR.(B.AND.C).OR.(A.AND.D)

Up to 10 items may appear in a condition list. Naturally,anticoincidence gates may also be used. One- or two-dimensonal arrays can be conditioned during the sort with the condition-lists.

PLSORT

SORT

Sort MEMPHIS list mode data

When sorting from tape, tape must be mounted before calling PLSORT program !

BIB KARL magnet spectrometer operating system.HELP LIBRARY
Author: J.Meissburger

Format: SO[RT] filename,nb,nr,rew_key

Where:	Default
filename - name of file with data	none
nb - number of first record to be sorted	actual position
nr - number of records to be sorted	999999
rew_key - if 'Y' tape will be rewinded before searching for file	

!!! rewkey is read only when sort is from magtape !!!

PLSORT

2DARRAY

Define new or change one of two previously defined 2-dim arrays
(See also by SCOPE 2DIM)
Maximum number of 2-dim arrays = 2

Format: 2DA[RRAY] (key,na,) nhr,npx,nox,ncx,npy,noy,ncy,con_list

Where:	Default
(key,na) - read only when array # 32 is already defined if key='YES' then array # na is redefined else nothing done	
nhr - For nhr=0 ---> Low resolution, else high res.	0
npx - parameter in x axis	none
nox - offset in x axis	0
ncx - compression factor in x axis	16
npy - parameter in y axis	none
noy - offset in y axis	0
ncy - compression factor in y axis	16
con_list - list of previously defined gates (max=10) terminated by 0<CR>	

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

(for more details see CONLIST)

PLSORT

WRITE

Write 1-dim spectrum into file compatible with SHOWPLOT program

Format: W[RITE] filename,na<CR>
comment<CR>

Where:

filename - destination file

na - source array number

comment - comment (max 80 characters)

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP PRINTERS (14 July 1986):

PRINTERS

Three line printers queues are available on the Big Karl VAX,

SYS$PRINT	COT-Printronix system line printer
SYS$LETTER	LA-100 memo/letter quality printer
SYS$LASER	LN03 high quality letter printer

Formatting is supported by a set of print forms, see:

$ show queue/form,

by logical configuration files for device and RUNOFF formatting (e.g. LASER$CONFIG_ELITE), and by DCL command procedures (e.g. $ LASER or $ LPRINT)

PRINTERS

Printronix

The Printronix lineprinter is the standard systems line printer connected to the line printer queue SYS$PRINT. The only special support on this printer is the Calcomp emulator library BKLIB:CALTRON.OLB which is used by some of the Big Karl utilities.

PRINTERS

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

LN03

The LN03 laser printer is supported by the following print command procedures:

$ LASER filename [options]	for command formatting
$ MPRINT filename	for 132 char/line printing
$ NPRINT filename	for internally formatted letter printing

For standard (german character set) letter printing the combined RUNOFF and device configuration files:

laser$config_elite	(12 pt. Elite)	or
laser$config_courier	(10 pt Courir)	

may be requested within a RUNOFF input file (*.RNO) and formatted with

$ RUNOF filename (LN03 device specific RUNOFF)

and printed on the laser printer with

$ NPRINT filename.LNI

Parameters to the DCL command "LASER" are explained on the header page produced by using the command itself !

More logical configuration files are available, see:

$ show logical laser$*

Files translating to *.DAT are device-only configuration, *.RNO are RUNOFF-only or combined configuration files.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

PRINTERS

LA100

The LA100 correspondence printer is supported by the command:

LPRINT filename [U or G] [L or S] for

U = ASCII character set
G = ISO german character set
L = large (letter) print format and quality
S = small (lineprinter) format and quality

If you omit the filename the command will prompt you for additional parameters. Typing <RET> for the filename allows you to configure the letter printer for a desired character set and print quality to print files containing no internal configuration data.

If you explicetely use any of the letter$... configuration files in your text (See: BKHelp RUNOFF) this will override the LPRINT parameter specifications !

The most important logical configuration file (combined device and RUNOFF configuration) is

letter$config

which configures the LA100 for german character set, 12 pt. letter gothic, high quality printing. For more configuration files see:

$ show logical letter$*

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP RDSHOW (14 July 1986):

RDSHOW

RDSHOW is a template program to show the use of the Big Karl standard free style input routines. To get a source listing see:

```
$ BKHelp rdshow source
```

General:

The RD... routines allow format-free terminal input with a set of interesting features that are intrinsic to the routines:

Free style command parsing with automatic defaulting
Forcing of variable types with lookahead for re-interpretation
Automatic background logging mode of terminal input
Program level batch mode with or without echo
Automatic Journal/Recovery mode for session reply
(This may be used to easely split a program with interactive input to calculate in a batch queue while maintaining the interactive input without reprogramming. For details ask J.Meissburger)

RDSHOW

source_code

```
CC
CC
CC    F I L E :   RDSHOW.FOR          SAMPLE PROGRAM TO DEMONSTRATE THE
CC    ======================          STRUCTURE OF A PROGRAM USING THE
CC                                    FREE STYLE INPUT UTILITIES RD...
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
CC                                        J.MEISSBURGER 20-AUG-82
CC
CC ************************************************************
CC
CC THIS FILE SHOWS AN EXAMPLE OF A COMMAND PARSER USING THE FREE
CC STYLE INPUT ROUTINES RD...
CC
CC THE SUBROUTINE "SERVICE" IS A DUMMY ROUTINE TO BE REPLACED BY
CC APPROPRIATE SERVICE SUBROUTINES. THE RETURN FLAG "LFLAG" HAS
CC TO BE RETURNED +1 ON SUCCESS, 0 ON ERROR HANDLED WITHIN THE
CC SERVICE SUBROUTINE AND -1 ON UNRECOGNIZED COMMAND ERROR.
CC
CC ALL ROUTINES WITH A FEW EXCEPTIONS AS INDICATED ARE WRITTEN IN
CC STANDARD PDP11 FORTRAN AND SHOULD RUN ON ANY COMPUTER. (REPLACE
CC "BYTE" BY "LOGICAL*1" IF NOT SUPPORTED!)
CC
CC ************************************************************
CC Note: RD_HELP is specific to VMS systems, all other routines can
CC               run on any computer providing at least Fortran IV
CC ************************************************************
CC
CC
C     PROGRAM RDSHOW
CC
C     INTEGER*4 CMDS(4), CMD, NC, LFLAG
C     INTEGER*4 LCMDS(4)
C     CHARACTER*128 HELP_LIBRARY, LEVEL_1_KEY
CC
CC LIST OF VALID COMMANDS
CC
C     DATA NCMDS /4/
C     DATA CMDS /'EX','HELP','CD3','CD4'/
C     DATA LCMDS /2,4,3,3/
CC
CC
```

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

```
CC INITILISE TERMINAL I/O, PROGRAM DEFAULTS AND DATA FILES
CC AND PRINT PROGRAM IDENTIFICATION.
CC
C     CALL INIT (LFLAG)
CC
CC HERE TO READ NEXT COMMAND LINE
CC
C10   CALL RDCMD(CMDS,LCMDS,4,'RDC',CMD,NC,LFLAG)
CC
CC CHECK FOR EOF DURING COMMAND INPUT
CC
C     IF (NC.EQ.0) GOTO 100
CC
CC BRANCH TO COMMAND SERVICE
CC
C     GOTO (100,200,300,400) , NC
CC
CC EXIT , THIS COMMAND PROVIDES STANDARD EXIT TO DCL
CC
C100  CALL SERVICE (NC, CMD, LFLAG)
CC    CALL CLEANUP ( ..... )
C     CALL EXIT
CC
CC HELP
CC
CC    This routine uses system services provided by VAX-11 VMS
CC    to gain keyed access to the HELP library BKLIB:BIGKARL.HLB
CC    To include a level-1 HELP file in the Big Karl system help
CC    library please inform J.Meissburger
CC
C200  HELP_LIBRARY = 'BKLIB:BIGKARL'
C     LEVEL_1_KEY = 'RDSHOW'
C     CALL RD_HELP ( HELP_LIBRARY, LEVEL_1_KEY )
C     GOTO 10
CC
```

```
CC CD3
CC
C300  CALL SERVICE (NC, CMD, LFLAG)
C     GOTO 10
CC
CC CD4
CC
C400  CALL SERVICE (NC, CMD, LFLAG)
C     GOTO 10
CC
CC
C     END
CC
CC ****************************************************
CC
CC
C     SUBROUTINE INIT (LFLAG)
CC
CC INITIALISE PROGRAM
CC
C     COMMON /INOUT/ NIN, NOUT
CC
C     DIMENSION DAY(3), TIM(2)
CC
CC INITIALISE TERMINAL I/O ON LUNS 5/6 IN COMMON /INOUT/
CC
C     CALL RDSET (0, 5, 6)
CC
C     CALL DATE(DAY)
C     CALL TIME(TIM)
CC
C     WRITE (NOUT,20000) DAY, TIM
C20000        FORMAT(//' RDSHOW:  ',3A4,2X,2A4/)
CC
CC LFLAG = 2 FOR THE VERY FIRST CALL TO RDCMD !
```

```
CC
C     LFLAG = 2
C     RETURN
CC
C     END
CC
CC ************************************************
CC
CC
C     SUBROUTINE SERVICE (NC, CMD, LFLAG)
CC
C     INTEGER*4 NC, CMD, LFLAG
CC
C     COMMON /INOUT/ NIN, NOUT
CC
C     WRITE (NOUT,20000) NC,CMD
C20000        FORMAT (' SERVICE # ',I2,'   CMD = ',A4)
C     LFLAG=1
C     RETURN
CC
C     END
```

RDSHOW

CD3

Dummy command CD3 of RDSHOW executed !

RDSHOW

CD4

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

Dummy command CD4 of RDSHOW executed !

RDSHOW

HELP

Access HELP information of RDSHOW in Big Karl system
help library.

RDSHOW

EXIT

Exit task and return control to DCL

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP RSX11M (14 July 1986):

RSX11M

PDP-11/40 and RSX-11M:

Login as: username: PDP_USER (turnkey account)
password: USER

or username: PDP_familyname resp.

to run full RSX-11M compatibility mode (UIC=[100,100]). Task images will have extension .EXE instead of .TSK, and the TKB command files have to include ..... , LB:[1,1]FOROTS/LB, in order to link in the complete RSX run time library.

To test CAMAC software on the VAX the CAmac SIMulation Interface Routines corresponding to the IKP-Library on the PDP-11/40 (Big Karl) are available as .... , DK3:[1,4]CASIMIR/LB, ...

The Fortran compiler, linker, macro and librarian are identical to those running on the Big Karl PDP-11/40 control computer ! Device-dependent system routines have nevertheless to be linked in on the PDP11 in order to work properly (There is no translation of hardware addresses and interrupt vectors from the PDP11 to the MCR-compatibility mode)

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP RUNOFF (14 July 1986):

RUNOFF

To support high quality text printing (large format) use:

$ RUNOF filename (n o t RUNOFF) for the LN03 laserprinter
or
$ RUNOFF filename for the LA100 printer

There are several combined Runoff/device-configuration files available for text formatting and font selection. The most important ones are:

laser$config_elite	for elite 12 pt (german) printing
laser$config_courir	for courir 10 pt (german) printing

on the LN03 laser printer, and

letter$config	for letter-gothic 12 (german) printing

on the LA100 letter printer.

You may include the configuration files by a Runoff request:

.req "letter$config"	for combined RUNOFF and letter printer configuration (high quality letter gothic, german)

(which is the best method since it automatically includes possible configuration file updates), or you may copy the configuration data directly into the text file by a EDT "Include" command.

In case you wish a different layout for the LA100 letterprinter you should use:

```
.req "letter$rno"       default RUNOFF configuration
.lo xx,xx               to define your layout
.req "letter$default"   for letter printer setup
```

as first commands in your RNO file. The layout for laser printer configuration files is undefined , use of .layout 3,2 as standard is recommended.

The commands for printing are:

```
$ LPRINT filename.MEM       for letter printer output    or
$ NPRINT filename.LNI       for laser printer output
```

For more information also see: $BKHelp PRINTERS

RUNOFF

LN03_Example

To see a sample input file using most of the character- and font-switching features of Runoff and the laser printer you may look into the sample file:

```
$ edt/read user$manager:lntest.rno
```

or produce a hardcopy output with:

```
$ runof user$manager:lntest
$ nprint/delete lntest.lni
```

This sample output shows USASCII, German, DEC-supplemental character sets and examples of general text formatting including scientific formulae.

File: LNTEST.RNO - test LN03/Runoff configuration, J.Meissburger, 27-Mai-1986

Example: Character sets and special control characters:

Deutsche Umlaute (German character set = G0):

ä ö ü Ä Ö Ü ß

>> * <<

Griechische Buchstaben (DEC technical character set):

α β χ δ ε φ γ η ι θ κ λ ν ∂ π ψ ρ σ τ ƒ ω ξ υ ζ

∝ ∞ ÷ Δ ∇ Φ Γ ~ ≃ Θ × Λ ⇔ ⇒ ≡ Π Ψ Σ √ Ω Ξ ϒ ⊂

∀ ∃ ∫ ∫ ⌊ ⌉ ⌈ ⌈ ↑ ← → ⊃ ∪ ∋ ⌈ ⌊ ⌋ ⌊ ⌋ ∫ ≤ ≥

>> * <<

DEC Supplemental (G0 multinational character set - 8 bit):

µ ± ¼ ½ « » å Ñ ñ æ Æ Ø Ÿ ß © £

>> * <<

$^{16}O(^{3}He,^{6}He)^{13}O$

Text by D.Prasuhn 27-Mai-1986

Zusammenstellung der Daten über erreichbare Teilchenzahlen bei der Stripping-Injektion von H_2^+ in COSY

Die Injektion von Protonen in COSY wird über die Stripping-Reaktion von H_2^+ ---> 2 Protonen erfolgen. Die Wahrscheinlichkeit für die Umladungsreaktion beträgt bei einem 20 µg/cm^2 dicken Kohlenstofftarget ca. 90%. Daher beziehen sich die nachfolgenden Berechnungen der erreichbaren Protonenzahlen auf ein Kohlenstofftarget dieser Dicke.

Injektionspunkt ist die Austrittsöffnung am Dipolmagnet MD23 (der vorletzte Dipol der Einheitszelle vor dem Targetteleskop, Entfernung vom TP1 in Umlaufrichtung 158.147 m).

Bei der folgenden Berechnung der erreichbaren Anzahl der Protonen im Ring gehe ich von einem zur Verfügung stehendem H_2^+ -Strom von 5 µA aus. Dies ergibt einen Protonenstrom von I_p = 10 µA.

Dies entspricht einer Protonenanzahl pro sec. P_0 von:

$$P_0 = \frac{I_p}{1.6 * 10^{-19}\ \text{A sec}} = 6.25 * 10^{13}\ \text{Protonen/sec}$$

$$= 1.25 * 10^{8}\ \text{Protonen pro 2 µsec}$$

die zeitlich einem Umlauf der Protonen in COSY entsprechen.

Die angenommene H_2^+ -Energie beträgt 90 MeV, entsprechend einer Protonenenergie von E_p = 45 MeV.

Die Berechnungen beziehen sich auf den Arbeitspunkt, der im technischen Bericht in der Tabelle 3 als Arbeitspunkt für die Injektion beschrieben ist.

Parameter sind:

Arbeitspunkt : $Q_x = 3.867$ $Q_z = 4.119$

Lattice-Funktionen am Ort der Injektion:

$\beta_x = 7.031$ m $\beta_z = 15.426$ m
$D = 4.364$ m

Maxima in den Einheitszellen:

Lattice-Funktionen : $\beta_x = 25.080$ m $\beta_z = 15.913$ m
Dispersion : $D = 7.603$ m

Die horizontale Akzeptanz ist bestimmt durch den Ort der maximalen Betafunktion und maximalen Dispersion. Die Maxima beider Funktionen treten in dem Kühlteleskop mit den Werten $\beta_x = 46.91$ m und $D_{max} = 10.2$ m. Bei einer möglichen Strahlausdehnung von $d = \pm 65$ mm und einer Impulsunschärfe von $\delta = \pm 0.2$ % ergibt dies eine monochromatische Akzeptanz von:

$$\varepsilon_x = \frac{(65\ \text{mm})^2 - (101.2\ \text{mm/\%})^2 * (0.2\ \%)^2}{46.91\ \text{m}} = 81\ \text{mm mrad}$$

Sample formula:

$$\frac{\dot{\Phi}^2}{2} - \frac{\Omega^2}{\cos \Phi_s}(\cos \Phi + \Phi \sin \Phi_s) - \frac{2 \pi \Omega^2}{eV_0 \cos \Phi_s} E_1 \Phi = C$$

The input text file is available as USER$MANAGER:LNTEST.RNO
and may be inspected with: $ EDT/READ USER$MANAGER:LNTEST.RNO

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP SYSTEM (14 July 1986):

System_layout

The Big Karl site-specific system layout conforms to required VMS standards identifying every user uniquely on the system.

Apart from the user directories there are three main directory roots to store the DEC-VMS and Big Karl magnet spectrometer operating system:

sys$sysroot: DEC-VMS system root (not site-specific)

user$sysroot: Big Karl site specific system components:

user$startup:	System startup files
user$manager:	Device and system support
user$login:	Login/logout procedures
user$system:	System wide (installed) images

userdisk:[bksys...] Big Karl operating system application software (This root keeps the reference copies of all operating system components and should be maintained with great care !)

For each IKP-group (such as BK, KR etc.) there is a system wide logical group device (BK$:) and a corresponding master group directory (BK$LOGIN:). Login USERNAME is the group identifier (BK) followed by the family name of the group member (BK_MEISSBURGER) separated by an underscore "_". All group members have unique UIC member numbers but share the UIC group number with the master UIC.

Groups supported so far are:

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BK	Big Karl magnet spectrometer
C	C O S Y
CYC	Cyclotron
KR	Kernreaktionen
AXN	(alpha, Xn)-group
PKL	Peter Kleinheinz group
JOS	Josef group

Symbol definitions relevant to a l l group members should be entered into the group LOGIN file (e.g. BK$LOGIN:LOGIN.COM) preferably by a group manager who is responsable for a group-wide systems management (username = group identifier followed by "_", e.g. "BK_"). Important messages to the group into the message file (e.g. BK$LOGIN:NOTICE.TXT)

SYSTEM_layout

Automatic_backup

Due to a recent system reconfiguration (new system disk and new release of VMS) the automatic backup utility is not available. It is recommended that users do their own backups in the same way as the automatic backup did before by including

a first-level subdirectory such as

[meissb.backup...]*.*

on the private directories. It is recommended that users copy important (and only important !) data to this subdirectory for daily full and/or incremental backups.

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP TELEPHONE (14 July 1986):

Telephone

BIG KARL PHONE DIRECTORY

****

TELEPHONE

BODE

CHR.BODE 5615 -- PRIV: 02461/1250

TELEPHONE

SEHL

G. SEHL 5601 -- PRIV: 0228/311975

TELEPHONE

v.ROSSEN

P.v.Rossen 3096 -- priv: 0228/210900

TELEPHONE

BERG

G.P.A.BERG 4121 -- PRIV: 0221/464041

TELEPHONE

BRINKMOELLER

B.BRINKMOELLER 5884 -- priv: 055703

TELEPHONE

HADAMEK

H.HADAMEK 6352 -- PRIV: 02517

TELEPHONE

HARDT

A.HARDT 3623 -- PRIV: 052140

TELEPHONE

HLAWATSCH

G.HLAWATSCH 5601 -- PRIV: 02421/15486
1-86-2569 KFA Direktwahl
1-86-2583
Technische Universitaet Muenchen, Dep. E-18

TELEPHONE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

KOEHLER

M.KOEHLER 3283 -- PRIV: 053709

TELEPHONE

KRUCK

K.P.KRUCK 6593 -- PRIV: 02402/20980

TELEPHONE

MARTIN

S.MARTIN 3623 -- PRIV: 08544

TELEPHONE

MEISSBURGER

J.MEISSBURGER 4739/5139 -- PRIV: 04853

TELEPHONE

PAUL

D.PAUL 5139 -- PRIV: 056611

TELEPHONE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

PFEIFFER

J.PFEIFFER 6980 -- PRIV: 02421/53417

TELEPHONE

PRASUHN

D.PRASUHN 4121 -- PRIV: 02244/3682

TELEPHONE

RETZ

A.RETZ 6360 -- PRIV: 054528

TELEPHONE

ROGGE

M.ROGGE 4122 -- PRIV: 08358

TELEPHONE

ROSSKAMP

J.ROSSKAMP 4267 -- PRIV: 08630

TELEPHONE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

STOFF

H.STOFF 6490 -- PRIV: 02464/7841

TELEPHONE

EXPERIMENT

BIG KARL CONTROL ROOM (ROOM 47) 5139
BIG KARL NORTH HALL (SPECTROMETER) 6374

TELEPHONE

CYCLOTRON

CYCLOTRON CONTROL ROOM (OPERATORS) 6454

TELEPHONE

DEC

DEC-TECHNIKER 4093
DEC KOELN 0221-5486-1
DEC Muenchen (RDC center) 0-089-418016

TELEPHONE

TSS

TSS CONSOLE 4380

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

TELEPHONE

KLIMAANLAGE

KLIMAANLAGE 6111

TELEPHONE

STRAHLENSCHUTZ

STRAHLENSCH. 6354 -- PRIV: (PROBST) 02428/1472

TELEPHONE

TEKTRONIX

TEKTRONIX 0221/77221

TELEPHONE

SILENA

SILENA ADC's 06055-4021

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

BKHELP TERMINALS (14 July 1986):

Terminals

A number of different terminal types is supported around the Big Karl VAX. Special configuration support is available for most of them in a user-transparent way on either DCL command level, Fortran program level or in the form of logical files which may be included in user-generated data files. Some of the more frequently used libraries such as "GMA10" include this support automatically.

Big Karl terminal type definitions:

/FT1	=	GMA102 - DMA graphics terminal (dev_class = realtime)
/FT2	=	Hewlett Packard 2648A graphics terminal
/FT3	=	Tektronix 4010/4012/4014 graphics terminal
/FT4	=	Westward 1015 graphics terminal
/FT5	=	Hewlett Packard 2623A ANSI/graphics terminal
/FT6	=	Tektronix 4105 color graphics terminal
/FT7	=	Plessey PT-100G high resolution graphics terminal
/VT100	=	VT100 alpha or Retrographics VT100 GB graphics terminal
/LA100	=	DEC LA-100 letter matrix printer (memo-quality)
/LN03	=	DEC LN03 high quality laser printer

To get a list of the terminals installed in the system see:

```
$ TERMINALS
```

TERMINALS

TTTYPE

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

There exists (BK)-system support to require the terminal type of the log-on terminal SYS$COMMAND or any other terminal (or logic device) in the system:

1) At DCL command level:

$ TTTYPE [logical_name]

This defines the two symbols:

TT_TYPE = actual setting of device type (e.g. "VT100")
TT_SYS_TYPE = true terminal device type (e.g. "FT6" or "DSPORT" for dataswitch lines)

In addition the system defines the symbol:

TT_SAV_TYPE = permanent setting of SYS$COMMAND device type at LOGIN time (not altered by calling TTTYPE !)

Special a) Any terminal of unknown type will return "TTYUNKN"

Special b) The GMA102 DMA display is returned as TT_TYPE = "GMA0"

Special c) If a required device is n o t a terminal the device class will be returned instead (e.g. $ TTTYPE USERDISK: would return TT_TYPE = "DISK").

Special d) Devices not known to the system are returned "UNKNOWN"

Special e) Calling TTTYPE in a batch job will return TT_TYPE = "BATCH"

2) At Fortran program level:

CALL BK_TT_TYPE (....)

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

For details see: $ BKH BKLIB BKUTY BK_TT_TYPE

TERMINALS

TTMODE

The (BK)-system supports device-independent terminal configuration.

1) At DCL command level:

$ TTMODE mode_identifier [logical_name]

where "mode_identifier" is a mode identifier and "logical_name" is a logical name of a free ($ SH TERM logical_name should have "NO OWNER") terminal. If logical_name is omitted the default "SYS$COMMAND" is assumed.

If the required mode is not available on the specified device the command is simply ignored (no error message !). The two most important mode_ identifiers are:

$ TTMODE dec_mode switch the terminal to DEC-Edit mode

and

$ TTMODE tcs_mode to switch the terminal to TCS compatibility mode

2) At Fortran program level:

CALL BK_TT_MODE (....)

For detailts see: $ BKHelp BKLIB BKUTY BK_TT_MODE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

TERMINALS

TTCONFIG

The (BK)-system supports device-dependent terminal configuration for devices of known type:

1) At DCL command level:

$ TTCONFIG config_file[,config_file] [logical_name]

Example:

$ TTCONFIG ft5$clr_alph_displ,ft5$aids_off tta4:

would clear the alpha-memory of terminal TTA4: (if TTA4: is of type "FT5") and switch off the "Aids"-menue. TTCONFIG does n o t check for correct terminal type (use $ TTTYPE if necessary).

Note: TTCONFIG should only be used if special features of a known terminal type are to be supported and if the more general TTMODE procedure does not support the required configuration !

2) At Fortran program level:

CALL BK_TT_CONFIG (....)

For more details see: $BKHelp BKLIB BKUTY BK_TT_CONFIG

TERMINALS

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

LA100

Special support is available for the LA100 letter printer spooled to queue SYS$LETTER. Use:

$ SHOW LOGICAL LETTER$*

to display the corresponding definitions. The most important one is:

letter$config

which configures the letter printer for letter gothic 12, german letter size printing (use with german character set on terminal)

See also: $ BKHelp RUNOFF

TERMINALS

LN03

Special support is available for the LN03 laser printer, see:

$ BKHelp printers

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

BKHELP UTILITIES (14 July 1986):

Utilities

The utility programs to support Big Karl experiments all run on the Big Karl group-accounts BK_name ,e.g. BK_ONLINE for on-line data taking. To invoke a program just type the program name at DCL ($) command level. Most programs accept a HELP command at program level to provide additional information on the program. Normal program exit is ...> EXIT or <CNTRL-Y> in case of serious troubles.

Please watch the display of default directory or use the command $ SH DEF to keep track of your actual working directory !

UTILITIES

CYCLE

CYCLE is Big Karls RSX-11M control utility running on a PDP-11/40. It is used to set and monitor Big Karl status and keeps a background log of all activities.
Related commands are:

>	or	MCR> RUN CYCLE	to invoke the program
		MCR> STATUS	to display the sepctrometer status
		MCR> CYSTOP	to stop ongoing CYCLE activities

UTILITIES

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

ACQUIRE

$ ACON --> On-line ACQUIRE program system

$ ACOFF --> Off-line ACQUIRE

Program system to do data acquisition using Big Karls MEMPHIS data acquisition system. For more details see:

$ BKHelp ACQUIRE... and

$ BKHelp MEMPHIS...

UTILITIES

ACPLOT

$ ACPlot --> Spectrum plotting utility

The program allows plotting of spectra generated by ACQUIRE or PLSORT on either the CALCOMP plotter or the systems lineprinter/plotter LPA0. Plotting format is variable.

See: $ BKHelp ACPLOT...

UTILITIES

TURTLE

$ TURTle --> CERN turtle decay

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

Ionoptics program to calculate Monte Carlo generated distributions of particle rays trough beam transport systems.

UTILITIES

IGM

$ IGM --> Big Karl Interactive Graphics Monitor

This program system allows the generation of graphical representations of very generally formatted data. It provides batch and hardcopy support and is callable as subsytem from FORTRAN program level.

See: $ BKHelp IGM...

UTILITIES

MOCAL

$ MOCal --> Big Karl MORRIS chamber calibration utility.

MOCAL is an interactive program system to generate the data tables for calibration of the Morris MWDC. It works together with ACPARAM, the user parameter definition utility for the on-line process ADON (ACQUIRE and ACQUIRERT).

See: $ BKHelp MOCAL...

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

UTILITIES

PLSORT

$ PLSort --> Off-line sorting utility

PLSORT is the general purpose off-line sorting utility that provides transparently organized access to ACQUIRE and MOCAL data tables and software modules.

UTILITIES

PLSTATUS

$ PLStatus --> Show actual status of private PLSORT system

UTILITIES

BKDAP

$ BKDap --> Big Karl data analyzing programs

This system of programs is used to further process the spectra generated by ACSPEC in order to generate angular distributions, energy calibrations, theoretical DWUCK calculations etc. The modules are:

$ ANGULAR
$ CALIBRATE

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

$ CROSSECT

$ INPUT

$ PLOT

$ POTENTIAL

$ DWUCK

$ INFO

UTILITIES

MATRIX

$ MATrix --> Big Karl optimization utility "MATRIX"

MATRIX calculates the elements of the BIG KARL TRANSPORT matrix using experimental raytracing. The "aberrations" are determined, optimal multipole settings and line broadening are calculated.

UTILITIES

MAGSET

$ MAGset --> Big Karl magnet setup utility "MAGSET"

MAGSET uses TRANSPORT calculations and empirical data obtained in previous optimization runs to give approximate start values for magnetic field settings. K-value tuning is taken into account and appropriate values are calculated for Q2 and QB.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

UTILITIES

TRANSPORT

$ TRAnsport --> Big Karl TRANSPORT program

TRANSPORT version with extended plotting facilities.
For details ask S.Martin, ASI.

UTILITIES

TAPECOPY

Tape copy utility to read aritrarely formatted tapes into
Files-11 disk files (e.g. IBM, HP tapes etc.)

UTILITIES

REVMOC

$ REVmoc --> Ionoptics code "REVMOC"

UTILITIES

STRAGGLE

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

$ STRaggle --> Straggling calculation (Vavilov distrib.)

Energy straggling and energy loss simulation.

UTILITIES

BRHO

$ BRHO --> Relativistic kinematics including energy loss

The program system BRHO is Big Karl's general purpose kinematics utility. It calculates kinematical quantities for two-body reactions including energy loss in composite targets. Output is either numerical or graphical representation of angular and energy dependence. For more details see:

$ BKHelp BRHO

UTILITIES

KINE

Replaced by BRHO, see: $ BKHelp BRHO...

UTILITIES

KIN1

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

$ KIN1 --> K-values and Q2-tuning

KIN1 calculates the PRE2 (=Q2) values for a matched tuning of Q2 depending on K-value (Lab. angle)

UTILITIES

BKARLO

$ BKArlo --> Energy loss through Big Karl (or any other layered detector setup)

BKARLO is a general purpose program to calculate energy loss by integration trough composite absorptive layers (such as Big Karl spectrometer or detector setups) It is used for setting up particle identification by energy loss gas counters or plastic scintillators. Input is symbolic with predefined material constant data tables.

See: $ BKHelp BKARLO

UTILITIES

MWPC

$ MWPC --> Calculate MWPC voltages

Program to calculate the setup voltages for the Koehler MWPC for standard gas.

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

UTILITIES

GAMES

$ GAMES --> Big Karl recreation area

Choice of computer games. Warning: When playing one of these games you automatically lower your process priority !

UTILITIES

DEMO

$ DEMO --> Graphics Demo (TCS-compatible TERMINALS)

Set of demonstration programs to test the TCS (PLOT10) compatibility of a terminal as well as some special enhancements for 41xx-family terminals. For details ask J.Meissburger.

UTILITIES

BKMERGE

Same as BKFIT, see: $ BKHelp BKFIT...

BIB KARL magnet spectrometer operating system HELP LIBRARY
Author: J.Meissburger

UTILITIES

BKFIT

$ BKFIT --> Big Karl general purpose specrum manipulation utility to

read , write, merge , modify , analyze and display

spectra written on data files in Big Karl standard format (*.SIN)

For more details see: $ BKHelp BKFIT...

Note: BKFIT was planned to become Big Karls most general fitting utility by connecting an interactive version of CERN MINUIT with standard and user defined fit routines to the user interface provided in BKFIT (J.Meissburger).

UTILITIES

CTR

$ CTR --> COSYTRIEVE (CTR) data storage and retrieval system (Poor man's Datatrieve)

Used to keep literature index or hardware module data bases.

See: $ BKHelp CTR...

UTILITIES

BIB KARL magnet spectrometer operating system HELP LIBRARY

Author: J.Meissburger

MINUIT

$ MINUIT --> General purpose fitting utility (CERN)
with standard extension for Chisquare
fitting and display of results (MINFIT)